

4-C
4-A
4-B
4-C
4-D
4-E
4-F
4-G
4-H
4-I
4-J
4-K
4-L
4-M
4-N
4-O
4-P
4-Q
4-R
4-S
4-T
4-U
4-V
4-W
4-X
4-Y
4-Z



System Q is the IBM operating system designed for its FS (Future Systems) central processor which will probably be announced in 1975 for shipment a year later [CW, Mar. 23].

The system will also be compatible in limited form with the 370 processors being marketed today. A scaled-down version of the system will be announced in 1974 for use on the 370 in 1975.

Recent documents released in the IBM-Telco antitrust suit outline some of the requirements System Q is expected to meet.

The following series (Pages 43, 45, 46, 47) discusses some of the major items in this plan.

'Q' to Supplant IBM Software

By E. Drake Lundell Jr.
CW Staff Writer

TULSA, Okla. — "The number of programming systems has grown to the point that some or all of them must be obsolete," according to secret IBM documents which further detail the firm's plan to develop System Q for the 1974-75 time period.

Although the documents were written in 1970, they give some insight into the IBM programming strategy at that time — a strategy that apparently hasn't changed to this day.

One of the main reasons for obsoleting the present programming systems, the IBM planners said, is because "it is increasingly doubtful these systems will be able to support long-range revenue goals of the division."

To meet these needs, therefore, the Planning and System Development Division "must construct a new system which will completely obsolete and replace present generation systems. This system must satisfy the marketplace requirements for function, price and performance. It must provide a convenient migration path for the customer population," the documents said.

10-Year Life

In addition, they declared that the new system "must be designed to last at least a decade" and that "its cost/value relationship must substantially exceed today's return on programming investment."

IBM said it recognized it had a problem in the 1960-64 time frame when several different hardware systems competed for resources both in manpower and funds. "In addition, this proliferation of systems was fragmenting the marketplace," the planners noted.

(Continued on Page 43)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

June 6, 1973

Vol. VII, No. 23

'Be Safe—Try to Break Your System'

By Marvin Smalheiser
CW West Coast Bureau

LOS ANGELES — Jerry Neal Schneider feels the best way to protect a data processing system is to have some one trying to claw his way into it.

The challenge is healthy for the system, according to Schneider, who is a systems engineer in a way into the Pacific Telephone and Telegraph Co. computer system to steal more than \$1 million worth of electronic equipment.

Schneider was still in college when he broke the telephone company's computerized ordering system.

He pleaded guilty to one count of grand theft, after investigators found more than \$100,000 worth of stolen memory. Other items were dropped, including burglary and receiving stolen property.

He served 40 days of a 60-day sentence in a minimum security facility and was released on probation for three years.

Schneider, 22, now is systems consultant for EDP Security, Inc., a company he helped organize.

"The user is really in a bind now with the current state of the art," Schneider said. The best way to develop confidence in a system is to try and break it, he added, and "we feel we can break into almost any system."

He suggested the following precautions to safeguard the integrity of user systems:

• Establish a positive frame of mind. "Say, 'We are going to become tighter. We are going to look, talk less and listen more.'

"A lot of problems are right out in the open if the company executive will look. Then he can immediately determine what needs to be analyzed. And he doesn't necessarily have to take drastic steps."

• An examination of physical security should be made to make sure there is protection for the equipment. The walls

(Continued on Page 8)

370 DOS Modified to Run on 360

370 Code Simulated, Backward-Compatible

By Don Lewis
CW Staff Writer

IBM announced some time ago that DOS Release 27 would be limited to System/370 users only, but two independent sources — Itel's Data Products Group and The Computer Company — have said, in effect, "we ain't necessary."

San Francisco-based Itel has been working on modifications of DOS 26 to allow support for the 7330 disk system, Itel's version of IBM's 3330, on 360/50s and 65s. That step includes a software-driven rotational positioning sensing (RPS) capability which is the key to 7330 use, Itel said.

Once the DOS 26 modifications are formed up, the company expects to complete work on a coding scheme that will allow use of DOS 27 on 360s, with IBM's modified improvements over DOS 26, but without getting caught on IBM's

use of instructions that are hardware-executable only on 370 mainframes.

Itel will do this by writing a series of 360-compatible instructions to simulate the effect of the 370 instructions and by invoking the appropriate series whenever a program instruction exception is sensed.

Expanding Edos

The Computer Company, Richmond, Va., is pursuing the same general concept in its just-released Extended DOS (EDOS) feature, which allows 360s to work with application programs that include 370-type instructions. The full-blown

DOS 27-compatible version of Edos is expected to be released later this year, company spokesmen indicated.

The Edos feature is available to the computer industry, but it is not "370 compatibility" to machines smaller than those that can utilize Itel's 7330 and that vendor's software modifications. This might be called "backward compatibility" by some industry observers, the Edos people said, but they argued it is really a forward step for users.

It means that a 360 can be used for backup for a 370, they noted, even when

(Continued on Page 2)

User, Industry Fates Hinge On Telex-IBM Case Verdict

By E. Drake Lundell Jr.
CW Staff Writer

TULSA, Okla. — All the testimony has been taken and within 45 days Judge A. Christian Christensen should reach a de-

cision what they feel are the most important questions in the case.

After that session, Christensen has promised to hand down his ruling within 30 days, so the case will be over by the middle of July at the latest.

Arguments Outlined

In its closing statements, Telex will probably argue that the independent per-

sonal is a new data entry family on IBM's drawing board. Story on Page 51.

peripherals market is indeed a separate segment of the computer industry and should be treated as such by the judge.

(Continued on Page 2)

Expectation, Reality Mark NCC's Opening

By a CW Staff Writer

NEW YORK — An attendance that could exceed 30,000 and the return of the National Computer Conference to the New York Hilton and the Americana hotels Two hundred and six exhibitors are expected to exhibit in 620 booths at the New York Coliseum.

Officials of the sponsoring society, the American Federation of Information Processing Societies, said the 5,200 registration figure is ahead of that for the 1972 Fall Joint Computer Conference when 21,000 persons attended in Anaheim.

But since two of the largest segments of

Analysis

cision in the \$1.2 billion antitrust suit brought by Telex against IBM.

That is because even though it is sure to appeal all the way to the Supreme Court no matter who wins, will surely affect the computer industry and computer users for years to come.

In addition, the decision will also serve as a guide to the Justice Department in its present antitrust suit against IBM, most observers believe. A decision favorable to Telex is seen as a spur to hurry the government case and a decision against Telex is seen as delaying the government case even further.

Oral Summons

The only remaining court action planned in the Telex case will come June 18, when lawyers for both sides will be given three hours each to present their concluding arguments before the judge.

In addition to these three-hour oral arguments, the lawyers for each side have been required to submit written arguments pointing out the legal precedents for their positions and outlining

On the Inside This Week

| | |
|------------------------|-----------|
| Doctors at Odds | — Page 6 |
| Over Hospital MIS | |
| RCA User Service | |
| To Share AT&T Lines | — Page 20 |
| Communications | 20 |
| Computer Industry | 51 |
| Editorial | 14 |
| Education | 48 |
| Financial | 62 |
| Professional Viewpoint | 16 |
| Societies | 39 |
| Software/Services | 17 |
| Systems/Peripherals | 24 |

(Continued on Page 8)

Did You Know?

One of a series MAKING IBM INSTALLATIONS WORK BETTER

ADR Software Products help EDP managers manage



Use MetaCOBOL to enforce standards and monitor program performance in a production environment.



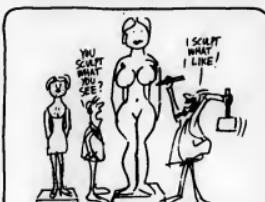
Install The LIBRARIAN to provide automatic master file backup and prevent accidental changes or unauthorized access.



Call on AUTOFLOW for systematic debugging and maintenance.



Take advantage of ROSCOE's on-line conversational programming capabilities to sharpen programmer skills and increase productivity.



Look into SAM's unique simulation modeling technique to assess future system growth requirements.



Let AUTOFLOW provide a tool for analysis, review and supervision of your program quality.

ADR software products give you the controls you need to effectively manage your EDP operation. ADR software can help you plan, implement, evaluate, and upgrade all elements of your computer environment. By using your computer to improve the performance—and productivity—of your costly technical and professional people. And by using your computer to exploit its own capacity and capabilities more extensively in a production situation. Find out how over 2,500 EDP managers have used ADR products to improve their EDP operations. Just mail us the attached coupon, or contact a nearby ADR office.



APPLIED DATA RESEARCH THE SOFTWARE BUILDERS®

ADR software products: In use at over 2,500 installations worldwide.

U.S. offices in Atlanta, Boston, Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, Pittsburgh, Princeton, St. Louis, Washington, D.C. Representatives in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Puerto Rico, South Africa, Spain, Sweden, Switzerland, Taiwan, West Germany

APPLIED DATA RESEARCH, INC.
SOFTWARE PRODUCTS DIVISION
Route 206 Center, Princeton, New Jersey 08540
Telephone: (609) 921-8580

Yes, I am interested in better management control.

Name _____

Company _____ Title _____

Address _____

City _____ State _____ Zip _____

Telephone _____

Computer Configuration

I am also interested in:

- AUTOFLOW... for maintenance and debugging
- The LIBRARIAN... for security and protection
- ROSCOE... for on-line program development
- SAM... for planning
- PI SORT... for faster sorting

Confidence is dealing with the world computer peripheral m



is largest independent manufacturer.

For OEM or End-User
products, call Ampex at

AMPEX

AMPEX COMPUTER PRODUCTS DIVISION
13631 West Jefferson Boulevard
Marina del Rey, Ca 90291, (213) 821-8833
800-421-6554 toll free.





Back on the Job

Epulu, the three-and-a-half-year-old chimpanzee who gave data processing a one-day flog before returning to a zoo in Germany [CW, May 30], makes his second consecutive "debut" on the pages of Computerworld, this time in fully unabridged form.

False Arrests Spark Police

CW West Coast Bureau

SAN FRANCISCO — In the wake of several false arrest suits, the police department here has publicly apologized for inaccuracies in the computer system used to identify wanted persons. "We are very sorry for the errors we made," said Capt. Jere-

niah Taylor, although he said the errors were those of human oversight rather than the computers themselves.

The police department has been sued for amounts up to \$1.5 million by persons who claimed they were detained on charges ranging from failure to

TRULY CLEAN 3-YR. 370 LEASES

Walkaway leases on all 370 models, on-order or installed. No individual or institutional information (no brokers, please), call Tom Martin:

COMPUTER FINDING CORPORATION
201 East 66th St., New York, N.Y. 10021/(212) 679-5210

EUROPEAN

BROKERS • DEALERS • OWNERS

We are interested in purchase and/or lease of computer units and also sale disposition of our owned computer units.

Reply interest and proposals to:

CW Box 3690
750 Washington St.
Newton, Mass. 02160

IT'LL BREAK YOUR BOTTLENECK

It's Decision Data's 9610 Interpreting Data Recorder that can keypunch, verify, reproduce, gangpunch, interfile and interpret 96 column cards all on one machine.

So versatile that it's been selected to break the bottlenecks in many 96 column computer installations.

So many features to ease 96 column data preparation that you'll want it for your installation. For a quick lesson in how "break your bottleneck" with the 9610, call the man from Decision Data - the world's largest independent supplier of 96 column equipment.

The 9610: Another SuperMachine from Decision Data.

DECISION DATA®
100 MITCHELL ROAD NEWBERRY, PENNSYLVANIA 15066 • (412) 621-4671

COMPUTERWORLD

Some Claim System a 'Nightmare'

MDs at Odds Over Hospital MIS

By Marvin Smalzieser

CW West Coast Bureau

MOUNTAIN VIEW, Calif. — Some physicians rebelling against a computerized medical information system (MIS) at El Camino Hospital here are actively campaigning to have it removed.

Dr. Lawrence Epstein, one of the leading opponents of the integrated system, said the system has "caused deterioration of our ability to care for patients." "It is bulky and difficult to work with charts and difficult to interface with the machine. When we try to dictate resumes

from the record room, it's a nightmare." He blamed voluminous output from the computer.

Hard to Read

Patient records are unreadable "because the computer throws out" information totally alien to what we're used to. Reams of computerized notes and lab work are impossible to read," he claimed.

Dr. Ralph Watson, chairman of the MIS physicians' committee, takes a more positive position. "The system can do the job we want it to. We're at the point now as far as value to the hospital. We have more accuracy of scheduling medicines and lab work to be done."

"It has great potential for cost containment. But we don't have proof yet. We're working on that now."

46% Favor It

A recent survey of the 450-bed hospital's physicians showed that 42% want the MIS removed. But 46% favored the system.

About 58% said they would be willing to continue participating in research and development of the system.

However, 50.5% said the system should be dumped if "a substantial minority of clinicians are unwilling to participate in continued development."

Mea Culpa

pay overdue parking warrants to felonious auto theft.

The latest suit was brought by a San Jose couple who contend they were arrested, roughed up and held for 18 hours because the computer reported the car they were driving as stolen. They said their auto had been stolen two years earlier and returned to them.

Taylor said the police department's warrant system is used by the county and offices in outlying counties. Physicians who query the system by radio are supposed to make a direct verification by telephone but have neglected to do so.

Taylor said the police department's warrant system is used by the county and offices in outlying counties. Physicians who query the system by radio are supposed to make a direct verification by telephone but have neglected to do so.

State Reregisters Voters the Modern Way

By Ken Shonk
of Computerworld

FRANKFORT, Ky. — Kentucky has shifted to computerized voter registration after the state legislature ordered a complete reregistration of all the state's voters.

The computerized system will give the state for the first time a record of all the voters in each precinct and enable the state to give the news media and other organizations breakdowns on the sex, race and occupation of voters for each precinct.

County Imbalances

The legislature's move came after newspaper accounts re-

And Maybe by 1990...

JACKSON, Mich. — Traffic in Jackson County, Mich., should flow more smoothly by 1990, thanks to a state plan that is now developing a master plan for the Jackson Area Comprehensive Traffic Study (Jacts) committee.

The Jacts technical and policy committees test their developing plan by feeding it into the computer, which then assigns traffic loads projected for 1990 onto the road network. The printout shows which roads will be over-loaded if the plan is fully implemented. Then the computer shows how a specific modification of the plan will affect traffic flows on other roads.

The committee's final plan will be the basis for distribution of federal and state road and highway assistance funds over the next 20 years.

The Jacts committee expect to test four modifications of their plan before the development deadline date in July.

vealed that in many counties voter registration lists were seldom updated and frequently not kept up-to-date, resulting in imbalances between counties.

The governor and his aides saw a computerized voter registration system as the least expensive and the most administratively sound of the alternatives as well as the only sure way of reregistering all of Kentucky's nearly one and one-half million voters in time for state elections this fall, according to state officials.

The computerized registration system provides for automatic purging of the voter lists, eliminating the need for local purge boards. Instead, the State Board of Elections will set up an appeals procedure for purged

voters. Monthly update printouts will go to each county

The state's Department of Finance and Administration is handling the operations on an IBM 370/155 with 500K. The voter registration operations are utilizing up to 100K, according to the state. The state Election Board is using a remote 370 video terminal to monitor operations.

Seine Stovall, secretary of state, said she expects breakdowns and problems this year with the introduction of the system, but primarily on the precinct and local level. Before the introduction of the computer, the state Election Board did not even know how many precincts there were in the state.

Nato Air Defense Now on Target

LONDON — A \$300-million computerized air defense system, which stretches from Norway to Eastern Turkey is now operational.

The Nato Air Defense Ground Environment (Nadege) chain of early-warning radars and air traffic sensors, tied to a data communications network and computerized control centers. These are combined with interceptor bases and ground-to-air missile sites to provide "decide-to-destruction" protection against hostile aircraft.

Long-range radars search out unidentified, and potentially hostile, aircraft. Electronic sightings are fed into computers which record their speed, altitude and course.

The computers are preprogrammed with such information as identification codes of friendly aircraft, weather conditions,

enemy forces available, and possible methods of attack, and can determine if a sighting is a "known" or "unknown" aircraft.

Once a detection is classified as "unknown," a military officer may order an interceptor aircraft to visually inspect the unknown aircraft.

In war, he may order missiles fired to destroy intruders.

A Signal to Pollution

SALT LAKE CITY, Utah — Computerized traffic signal control will be required by City Council 1975 federal standards on carbon monoxide in the air.

Streets Commissioner Stephen M. Harsmen said the city will have difficulty in securing and implementing the control system, which is aimed at smoothing traffic flow and therefore reducing exhaust output.

Next time that economical tape you bought to impress the boss costs the company a ton in re-run time, here's a note for your bartender:

Dear Charlie,

Don't forget to get me on the 11:46
to Mamaroneck.

And make sure I have my briefcase,
will you? My resume is in it.

Thanks for listening to all my
troubles tonight, Charlie. If only I'd
bought SMI Epoch 4 to start with
none of this would have happened.

Like you said, 6¢ per month doesn't
seem like too much to pay for the
security of a permanent computer tape.

Sorry about knocking over the jukebox.
I'll make it up to you when I get a
new job.

Wally Wenzinger



GRAHAM
MAGNETICS

Graham, Texas 76046

How to Make a System Secure ...

(Continued from Page 1)

should be strong, glass windows avoided and waste materials avoided.

Employees' Integrity

• The integrity of the employees must be tested.

"Tighter controls in the personnel department are required. Also, test the integrity of your employees and find out what their goals and merits are."

"A personnel application can be very revealing about an employee and a keen eye can pick up things like that."

• Data processing security should have a two-level check before it insures the accuracy of data, Schneider believes. "We watch input and output. We look to see if cards are slipped out of place, errors tacked onto programs or modifications made to programs."

Unauthorized use of the system has to be prevented, he said.

Schneider suggested it is sometimes better to turn the computer off and down a system for a day and run it manually.

"It would pick up a lot of programs written into the system which the user is not familiar with or may not be aware of."

• Host computers or host minicomputers can be set up alongside a computer to watch the programs.

"It would be an armed guard who watches a printer."

• Data scrambler can stop unauthorized data taps, which are "one of the easiest ways to get into a system," Schneider continued.

A person using a data tap can "record all the passwords and procedures to access a system," he said.

Manufacturers, Schneider said, should now think about security in the design of their new systems and think about implementation of host computers or minicomputers as auxiliary controls for security.

"Manufacturers should get together with consultants to find out what the problems are and develop products

NCC Marked By Expectation

(Continued from Page 1)

attendees, the exhibitor guests and the exhibitor-only attendees, do not generally represent the officials said the pre-registration results are not a fair indication of total attendance.

IBM's first appearance in a national DP trade show since 1970 will be highlighted by a System/3 Model 10 which, along with a 370/145 located off the floor in the Coliseum, will support multi-application demonstration in areas such as medicine, government, education and manufacturing.

Outgoing executive director of Afips Bruce Gilchrist defined Afips' challenge as how "seriously it wants to attack major problems within the industry," and named two, standards and standardization.

"These are major issues which I think need to be attacked in a responsible approach, but they're tough issues, because they immediately get you into a position of having to address major economic problems."

"Obviously, you tread on people's toes when you do that. If you only attack minor issues, no one bothers you," he observed.

"People within the field should have a strong voice to address key issues and not wait for the manufacturers or the government to make the decisions for them," he urged.

Replacing Gilchrist as executive director of Afips will be Robert W. Rector, who will assume his new responsibilities July 1, concurrent with the beginning of Afips' fiscal year.

Rector is currently chairman of Afips' finance committee.

needed in security instead of introducing customized products for particular security applications."

Schneider said his firm, which now has a staff of 13, will soon merge into now dormant Electronic Data Processing Services Inc.

In addition to services, it will offer products such as electronic locks, closed circuit television, monitoring consoles, supervisory panels, remote-access beeping systems, low-cost data scramblers, debugging devices for telephones and paper shredders.

The new firm, Schneider said, will offer services which will be able to sit down and study security problems on a project-oriented basis.

The major effort, he said, will be in "perpetrator analysis," which he described as a technique to challenge system security by looking for weak points to try to break the system.

Being helpful to organize EDP Security, Inc., Schneider tried to join the telephone company but "they didn't want any part of me."

370 Lease May Save User 30%

CW Washington Bureau

NEW YORK — Users can save between 10% and 30% on a new 370 lease program being offered by Ford Motor Credit through DPF, which will be the marketing arm for the new program.

Under the new leases, which run from three to seven years, users can lease 1000 on three-year deals, 15% on a four-year plan, 15% on a five-year deal and 30.6% on a seven-year lease. All of the plans can be terminated after three years, but if a user has signed up for a longer term he will have to make up the difference between that rate and the three-year rate, DPF said.

The new leases will allow users to add IBM 370 CPUs with the exception of the 155 and the 165, the firm said, and the rates are for CPU and memories only.

The savings on a systems basis could be much higher, sources indicated, if the user chooses all independent peripheral equipment with his system, since the independent peripherals can

be offered also at a discount over the IBM price for the same devices. Peripheral equipment with the new leases will be offered by DPF from a wide range of independent peripheral companies, the firm said.

At the same time, DPF will continue to offer its long-term eight-year leases which promise the user greater savings over the IBM price if he is willing to commit to a term and which come packaged with independent peripheral equipment.

In the area of upgrade penalties, DPF said that in all cases its penalties for upgrading would be less than the ones charged by IBM on its four-year lease. There are also some interesting extended privilege options available. If a user, for example, under a five-year plan at the end of three years, decides to use the system for another three years, he can sign a new three-year contract and have the monthly rental reduced to 75% of the IBM price instead of the 82% he would have been paying on the five-year plan.

Newest member of the NCR Century computer family

Combines advanced hardware and sophisticated software at an exciting low price.

The "251" is an exciting addition to the completely compatible NCR Century family of computers. Many of the outstanding performance characteristics of its big brother, the NCR Century 300, are inherent in the "251" at considerably less cost.

Advanced hardware architecture includes: independent access paths to main memory for the I/O processor and CPU; independent asynchronous memory modules; separate user and supervisor registers; and multiple BAR/LAR registers—all of which are a must for efficient multiprogramming and real-time processing.

Sophisticated software includes a multiprogramming system utilizing these hardware features and supported by the ultimate in operator communications and control. The speed and flexibility of a CRT provides instantaneous system

and job status displays, and touchplate control for rapid operator response. Other features include: I/O spooling, unit and file sharing, automatic job scheduling, remote job entry and dynamic resource allocation.

For the money, these kinds of advanced hardware-software features are all but impossible to find in other systems.

Call the nearest NCR office for the specific benefits you can expect from the NCR Century 251... as well as from any of the other five members of the growing NCR Century family.

NCR
Terminals & Computers

DPMA Show Hopes for Success, Must Buck Competition

By Edward J. Brice

For the CW Staff

CHICAGO — Facing stiff competition from two other major computer conferences within three weeks, the Data Processing Management Association (DPMA) will host its annual conference here June 25-29.

Officials are hoping the exhibitor and attendance totals of last year (70 companies, 5,200 total attendance), when the show was held in New York, could be equaled.

The format is similar to last year's, with opening-day sessions comprised of industry tours of DP centers, and second-day events consisting of all-day workshops and the exhibit, which opens at 10 a.m.

The speech-making and seminars begin on Wednesday, June 27, with the keynote being given by William L. Lindholm, vice-chairman of the board and chief operations executive with AT&T.

Information Management

Most of the individual workshops are

being chaired by industry marketing experts, with two co-chairs; a few sessions will also conduct formal sessions in the conference, whose theme is "New Dimensions in Information Management."

DPMA said recently that some 50 companies had signed up as exhibitors, including IBM and Univac, with others in the peripheral and supplies fields.

Three weeks before DPMA is to open, the American Bankers' Computer Conference and Exposition is scheduled for New York City, and that same week, here in Chicago, the American Bankers' Association will hold its annual Automation Conference, one of the biggest of the banking industry's data processing shows.

Workshops, Seminars

The six separate one-day workshops scheduled for June 26 include meetings on banking, government applications, insurance, manufacturing, medical/hospital applications, and systems development.

For the most part, these concurrent sessions are conducted by large users such

as Harris Trust and CNA Insurance. All meetings and the exhibit will be in the Conrad Hilton Hotel.

DPMA defended its choice of industry insiders to conduct the other workshops, noting the speakers would be "independent" of the equipment manufacturer by session chairmen.

Who Will Speak?

Examples of session chairmen include the national sales manager for CDC's time-sharing operation, who will conduct a seminar on time-sharing applications; the program manager for Digital Equipment Corp.'s business systems division, who will conduct the session on minicomputers in business; the national sales manager for Stromberg-Dataphysic, who will talk on microfilm (reviewing "various techniques and equipment," DPMA said); and the manager of AT&T's planning and regulatory support activities, who will speak on interconnection and implementation of integrated data communications systems.

John Guerrieri, DPMA's director of research and professional services, said the selection of marketing personnel provided "public recognition of the best people available" for public speaking.

Although technical people are usually familiar with the equipment, the sales people are generally more up-to-date on applications, he noted.

He also said DPMA had had good past success with that approach.

The week's program finishes on Friday with a special opportunity on visually impaired programmers; the exhibits close Thursday at 6 p.m.

Information is available from DPMA headquarters, P.O. Box 502, Park Ridge, Ill. 60068.

N.Y. System Promises To Ease Overcrowding In Hospital Wards

BROOKLYN, N.Y. — A computer-based system is helping relieve overcrowding in pediatric departments of nine major medical facilities here by sending some patients at crowded hospitals to underutilized facilities.

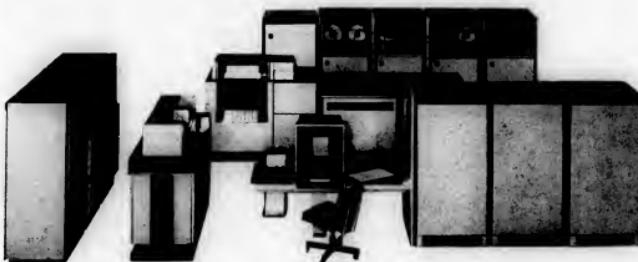
The program, called Embers (Emergency Bed Request System), was devised to include eight institutions: Methodist, Long Island College, Kings County Center, Jewish, Brooklyn, Coney Island, Kingsbrook, and Gwinnett hospitals and the Bedford-Stuyvesant Health Center, all of which are linked with Downstate Medical Center's computer center by direct telephone cable.

Where to Go

"The computer compares pertinent information concerning patient needs for hospital admission with stored and continuously updated information of the availability of hospital beds, and notifies the referring and receiving hospitals of the most appropriate disposition of the patients," according to Dr. Vincent Larkin, director of medical affairs for the Methodist Hospital and one of the system's authors.

The system becomes operative when the inpatient load in a participating hospital exceeds 90% of its pediatric bed availability. That hospital may request admission of a sick outpatient to another participating institution through the computer.

...the 251



BM 370's

Installed or on order.

Talk with CSA, a computer leasing company prepared to show you the way to greater prime and extra shift savings, all with the extra advantage of investment tax credit directly or in the form of a lower rate.

For further information, please call 207-442-4471.

**Computer Systems
of America, Inc.**

A Division of Computer Systems Leasing Company

79 Main Street, Boston, Mass. 02109

Send for the 12 questions you should ask of any leasing company before you lease.

Name: _____

Title: _____

Company: _____

Address: _____

City: _____ Zip: _____

State: _____

370 on order Installed

Model: _____ Date: _____

Rush to Computerization?

Counties May Pay 'Too Much' for Voter Registration

By Michael Weinstein
and
Toni Wiseman

With CW Staff

IOWA CITY, Iowa—Several counties within this state are paying "two to four times" what they should for voter registration computer services, according to Merle L. Kopel, Linn County auditor, and much of the problem appears to stem from a rush to computerization.

The overcharging, Kopel said, is indirectly caused by a state law which requires prelection registration in certain cities and counties. This requirement put a strain on local election offices, and officials with no knowledge of computer operations attempted to computerize the registration procedure in order to comply with the provisions of the law.

The 1970 bill requires every city with more than 10,000 voters and every

county with more than 50,000 voters to register these voters before each election.

Prior to 1970, in many areas voters would go to the polls on election day and vote. In most cases this was considered adequate as areas were small and most people knew each other.

But with the new law, many local offices had to develop a documented registration operation for the first time.

Variety Operations

These operations varied from city to city and most used computers in some form. For example, one city used the computer of a local college while another bought time from a local company and a third used the police computer on a part-time basis.

Before the 1970 law had time to settle into operation, however, a new law removed the responsibility from the cities and made the county auditors responsible

for the registration. Practically, this meant many county auditors were charged with combining their voter systems into a centralized county system.

To compound the problem, even had the auditors been DP experts, different cities were using different types of computers and different formats for data.

At this point, the Iowa Data Processing Co., through its president, Stanley R. Zegel, offered some county auditors a complete computerized voter registration service.

Who Pays for What?

IDP billed for its services on a transaction basis, as opposed to computer time used or nature of the programs, so it was hard to determine the exact nature of charges and how they were accrued, Kopel said.

But despite this inability to determine

the cost of each portion, the bottom line cost had led to numerous attacks on the services.

These have been directed at the cost and service provided by IDP and also at the system of no bidding that allowed IDP to go directly to the county auditors. "I've talked to some of the people who have had his [Zegel's] service," said Kopel, "and they can correlate nothing on his bill as far as a standard method of billing."

In Linn County, which had been using IDP's service, dropped it when Kopel became auditor. Kopel explained his actions:

"A representative of the firm [IDP] approached me about the sale of voter registration forms and voter registers for an amount of \$40 a thousand and \$35 a thousand respectively.

He had already received bids of \$10,000 and \$11,000 for voter services from another source. Further, disregarding the financial aspects for a minute, we had already found his [IDP's] service inadequate for what we had to do. He was the primary last year and mistakes abounded," Kopel said.

"Basically, they use scare tactics to take advantage of the naive," said T.J. Snarsky, director of information services for Cedar Rapids. "He [Zegel] gets the little touch-up because they don't have time to look at all this, and then offers his services."

Zegel defended his company's efforts: "It is not our obligation to see that they [the county auditors] go out and try to find someone else who would try and do what we do."

"If someone else says they do something similar to what we do, that's fine, they can make a proposal too."

But these are not the only factors, one official said. "Zegel is a registered lobbyist in the state and helped to write laws he is now offering service for. He is highly regarded by state politicians and unless bidding is open, he pushes there is too much of a temptation for local officials to act as political animals."

In any case, unless there is public bidding, the question of whether taxpayers pay four times as much as necessary for computer services will remain academic, he concluded.

N.Y. Harbor Dyed To Trace Pollutants

NEW YORK — With the aid of computers, the most polluted harbor in the U.S. may eventually see its waters clean again.

In an experiment sponsored by the National Oceanic and Atmospheric Administration, scientists dumped a "harmless" biodegradable dye into the ocean near the mouth of New York Harbor at 100 points from Ambrose Light to Coney Island. Airplanes and helicopters passed overhead snapping infrared, black-and-white, and color photographs of the dyed areas.

From the photographs, scientists hope to build a computer model of wave action and currents in the harbor, presenting graphic evidence of where pollutants travel once they enter the harbor's waters.

Scientists want to find out what percentage of pollutants are swept out to sea or get into the atmosphere through evaporation, so they can begin planning some means of control.

New York Harbor was chosen for the experiment because "about 70% of all the ocean dumping in the U.S. occurs either in or near New York Harbor," according to a Federal Environmental Protection Agency official.



POTTER puts it all together



SYSTEM 85 . . . Potter engineering puts it all together with advanced technology Diskette Data Systems.

SYSTEM 85 offers a new concept in data entry, the unique combination of flexible diskette and hard copy in an operator-oriented data station. Now data validation and correction become simple, efficient operations.



SYSTEM 85 . . . Featuring the DDS 8505 Diskette Data Station

- 150 lpm Impact Line Printer
- Flexible (Floppy) Diskette Drive
- Operator-Oriented Data Entry
- Communications

Potter's **SYSTEM 85** . . . The right solution for your industry and applications.

To learn how **SYSTEM 85** will fit into your data processing plans, call (516) 694-9000 or write Marketing Department, Potter Instrument Company, Inc., 532 Broad Hollow Road, Melville, New York 11746.

VISIT US AT BOOTH 2142-2144
NATIONAL COMPUTER CONFERENCE
NEW YORK COLISEUM, JUNE 4-6, 1973



POTTER. New Concepts in Data Entry.

New terminal. Old name. Same great reliability.

**The 4023. We build it so you
can read it.**

**Only \$98 a month, with
maintenance.**

We're making life a little more pleasant for terminal users. With a terminal that writes like people like to read. Quietly. In capital and lower case characters. Easy reading alone can improve user speed by 10% or more.

The 4023 lets you edit as you go. And update data you bring back. It makes refreshingly short work of long forms on the spot. Up to 1,920 characters at a time fits its flicker-free 12" screen.

Uses? Try instant order-entry. Tight-listed inventory control. Scheduling. Bar-chart forecasting.

For time-sharing or on-line systems, there's no more useful desk-top terminal for the money. (\$2995.)

Just as there is no better service than Tektronix' own 30 service centers nationwide.

Go ahead. Test our reliable terminal. Phone the nearest Tektronix sales office. Or write: Tektronix Information Display, P.O. Box 500, Beaverton, Oregon 97005.



**For those who
think tomorrow.**



**"Computer Leasing Company
showed me how
to boost my
throughput 50%...
for the
same money."**



Data Processing Managers all over the country are finding that they can eat their cake and have it too, thanks to Computer Leasing Company.

Let us show you how it's done. We'll probably be able to save you thousands of dollars on IBM computer equipment every month. Or increase your throughput capacity for the same money you're saving now.

Or maybe you would rather do both—save money and boost your capacity—by buying your own computer equipment instead of renting or

leasing it. Again, CLC will show you how to get the most for those computer dollars by designing a purchase plan or a lease/purchase option plan that meets your objectives today and tomorrow.

All this applies to peripherals as well as complete systems...a single tape or disk drive or an entire computing installation. We have a nation full of satisfied customers to prove you're better off with CLC. Contact us today for the money-saving facts.



2001 Jefferson Davis Highway • Arlington, Virginia 22202 • (703) 521-2900
New York • New Haven • Philadelphia • Pittsburgh • Charlotte • Kansas City • Houston • Los Angeles • San Francisco • Portland
"The men who know their business get their computing equipment from CLC."

Now
small
business
can afford
confusion.



On June 27th, Computerworld takes a big look at small systems.

New equipment and decreasing prices have made EDP feasible for hundreds of smaller businesses with gross revenues of \$5 million or less. But EDP systems on this scale are different from those used by large corporations. Small business users have different needs and smaller budgets. And they often don't have in-house technical staff. So many of their problems are different. And that's what our small systems expert, Ed Brade, will be looking at in our June 27th Small Business Systems Supplement.

Through the eyes of current small business users, we'll be examining some examples of successful use of computers, and some of the pitfalls you're likely to meet in attempting to install an EDP system. We'll discuss the problems involved in selecting the right equipment, summarize what companies can be expected to do, and discuss the technical problems of implementing a system. We'll also weigh the advantages of outside software, and go over the question of whether or not an in-house technical staff is necessary. We'll be getting part of this information directly from small business users who participated as panelists in the 1973 Computer Caravan. So you know it will be practically oriented, useful and timely.

If you use small EDP systems in your company—or if you're thinking of doing so—this June 27th Supplement is important reading. And if you're marketing small business systems equipment or services, your ad should be there. Close is June 8th.

For more information, contact the nearest Computerworld Representative.

| | | | |
|--|---|--|--|
| Boston Bob Ziegel (617) 332-5606 | New York Don Fagan (212) 594-5644 | Los Angeles Bob Byrne (213) 477-4206 | San Francisco Bill Healey (415) 362-8547 |
|--|---|--|--|

Or write to Judy Milford, Computerworld, 797 Washington Street, Newton, Mass. 02160

From Space Flights To Flood Monitoring —110 Has a New Job

By Toni Wiseman
Of the CW Staff

BIRMINGHAM, Ala. — RCA 110-A has been permanently grounded and the National Aeronautics and Space Administration has reassigned it for duty at the University of Alabama, where it will monitor river floods rather than space flights.

The 110-A is a digital/analog computer, designed specifically for NASA space applications and never marketed commercially. Only 24 were built, to be used for automatic testing of Saturn 5 vehicles. They have since been used to check Apollo and Skylab launches.

After it was last used, it was moved to check the Saturn 5 missile. The \$3.5 million machine was declared surplus and put out to pasture. The university was more than willing to provide a fresh "grazing" area.

The transition from NASA to the halls of academe was not an easy one for RCA 110-A. In January 1972, Dr. Thomas Gatts, director of the university computer center, and four students went to Huntsville. They disassembled the computer, loaded it on a truck and brought it back to the university. Engineering students there built a specially wired and air-conditioned area to house the machine.

It took students six months to reassemble the computer, and it wasn't operational until March 1973. Graduate students are currently writing a new and simpler language for the 110-A so more students will be able to use it, according to Gatts.

In addition to solving student problems, the computer will help solve sewage disposal problems and regulate the flow of Alabama rivers through spillways and floodgates without damaging surrounding areas.

Livestock Auctions Updated

LAFAYETTE, Ind. — The price of beef may not be going down, but at least computers are keeping down the cost of running livestock auctions.

Scientists at the University of Missouri-Columbia have developed a computer system to handle sales data at auction markets.

The system, which has been used successfully for three years in Missouri, minimizes the possibility of errors in computations and preparation of records and accounts, speeds up payments following sales, and provides management records of all business transacted.

The UMC program developers estimate that adoption of the system can reduce clerical costs by 50% for the nation's 1,700 livestock auction markets.



A very smart engineer introduces a very dumb terminal. Why is he smiling?

ADDS Consul 580. The Dumb Terminal. No editing. No formatting. No graphics. No polled environment. No built-in modem. No multiple operating modes. And strictly Teletype® compatible. In short, a very dumb CRT terminal.

Yet only an engineer as smart as John Jacobs could have designed it.

Paradoxical?

Hardly.

It takes a smart cookie to bake a simple cake.

John's credentials?

His pre-580 innovations still stir the industry's imagination. The Consul 880 CRT terminal

with its patented \$200 graphics option, and dual intensity formatting. The 28 lb. portable Envoy CRT terminal. The revolutionary black-on-white screen. The polled series 'A' terminals: 96 can be daisy-chained together without a cluster controller. And the dumb terminal?

It's brilliant.

John made it simple so it would sell for \$1795.* Here's what your bucks buy.

The most reliable TTY compatible terminal on the market. Cursor controls. Scrolling. Printer interface. XY addressing. Computer-controlled keyboard lock-out.

Five switch-selectable speeds and 24 lines with 80 characters each.

Consul 580. Dumb?

Not necessarily. And that keeps John smiling.

ADDS Applied Digital Data Systems 100 Marcus Blvd., Hauppauge, New York 516-231-5400



*\$1295 in OEM quantities of 100.

See us at the NCC show. Booth no. 2823

What's behind our smile. **ADDS**
Applied Digital Data Systems Inc

Editorials**Changing Communications**

A bill now pending in the Minnesota Legislature could effectively eliminate any cost advantages enjoyed by users of non-carrier communications equipment.

The bill would subject all suppliers (who install and maintain equipment attached to the phone network) to the regulatory control of the state Public Service Commission. Such control as applied to phone companies has required full justification of prices based on costs.

Also, the state PSC might have to set tariff rates for all non-carrier communications equipment in the same way it now sets charges for the phone companies. This could mean the same rates for both carrier and non-carrier equipment.

The original intent of regulation in the telephone field was to assure all users basic phone service at a fair rate.

But the world of communications has changed. There are now non-carrier suppliers who feel they can improve on certain services offered by the phone company.

To unnecessarily encumber these independent suppliers with the stringent demands of regulation would be grossly unfair to suppliers and users alike.

The Promise of System Q

The broad outline for System Q laid down by IBM planners points to a system that will be easier to use by both programmers, laymen and DP installation managers.

It is definitely a step in the right direction and if carried out should go a long way toward making data processing the easy-to-use commodity it should be.

But the lessons of the past indicate a great gap between the broad outlines for such systems and their reality upon release to the marketplace.

At the same time, IBM management committee minutes indicate there will be some trouble in providing all of the resources to develop System Q and to continue development of 370 programs in the 1973-74 period.

If, as the IBM management committee debated, there will be a struggle for the firm's software development resources during this time period, then there might be a tendency to drop development of some of the most difficult, but most potentially rewarding, features of System Q.

We hope IBM is still on schedule with System Q and the FS Series and that no features that would make the system easier to use have been dropped due to lack of resources for software development.

IBM likes to talk of technological leadership in the DP industry. Everyone will find out if it followed through with the System Q plans when the entire system is announced in 1975.

It's a long time to wait, but if the system lives up to its promise, it will be worth it.

Letters to the Editor**Cobol/RPG Dispute Shows Standards Gap**

Re the Cobol/RPG Controversy:

I can't believe the running controversy over Cobol and RPG. Who is trying to convince whom?

There are advantages/disadvantages to each, but the letter writers attack the other side with a zeal that leads me to believe each side wants to either oblige proponents for the opposite, or justify its own position, or both.

Efficiency, documentation, usability and other factors are being tossed back and forth with facts and opinions intermixed to such a degree that someone may well wonder, "Isn't there any way to objectively evaluate all this?"

It seems to me the heart of the problem is the DP profession's inability to produce a framework of standards, at all levels, that would perhaps provide some objectivity to controversies such as these. At least some common ground could be reached.

The ever-growing DP industry, a giant already, needs to get its act together so that it will be a great, fragmented area in our society, impeding progress in all areas. Where are our leaders? Or, where are the people in present leadership positions taking us?

Terry E. Berryman

Davenport College of Business
Grand Rapids, Mich.

Cheers for Compass

The article in the March 7 issue of Computerworld gives the impression that the NGPSS/6000 version of GPSS-V, developed by Norden for the Navy's CDC 6000 Series system, was coded on Cobol.

In actuality, the simulation package is a two-phase processor which used Cobol in the assembly phase and only for input stream syntax processing and data structuring. The GPSS execution phase required Compass for maximum speed and the output phase used Fortran.

Julian Reitman

Computer Simulation Branch
Norden Division
United Aircraft Corp.
Norwalk, Conn.
(other letters and viewpoints on Page 16)

Bird, Beast or ...?**Yes, It's True, DP Community Still Needs a Standard Code**

By Thomas W. Kern

Special to Computerworld

The data processing community still has a need for an across-the-board standard code. Ordinarily, when we refer to a standard code we are referring to a standard alphanumeric and is subject only to influences such as those that may affect the processing efficiency of the particular application.

However, as the system matures to meet ever-increasing workloads, more DP equipment is brought into the inventory. One of the major problems that must be reckoned with when making additional procurements is that the new equipment must be able to handle the code. Either it must be code-intensive or it must accommodate the

present system code without any degradation of performance or the incurrence of a cost penalty.

Larger Role Seen

It is at this point, the addition of code-sensitive devices to an existing system, that the original choice of code assumes a much larger role than had heretofore been attributed to it.

Viewpoint

In other DP applications where the code is undefined, the code is defined and data is unchanged at various points within the system, the use of a standard code is the first step in achieving data transference within the system.

One of the benefits of the acceptance of Asciil as a standard code has been its influence on the development of ancillary standards which, in turn, facilitate data and equipment interchange.

For example, there now exists a widely accepted standard for recording the code on punched paper tape.

A similar standard was developed for representing the 7-bit code on punched cards.

In this instance the standard was soon expanded in an anticipatory manner to accommodate an 8-bit code of which Asciil is a compatible 7-bit subset.

On a more controversial note, in the course of developing the first standard magnetic tape standard, it was necessary to settle what became known as the "fixing order" problem; i.e., the bit-to-track relationship of data bits in memory to the nine tracks of the tape. Without a standard code this relationship would have relatively little meaning.

Of Standard Importance

However, having established the code and subsequently this relationship, widespread interchange of data on magnetic tape among different systems became

a common reality and not just a remote possibility.

More recently, in the development of the standard for the digital magnetic tape cassette, a device that did not exist as a DP product when Asciil was devised, it seemed only natural that the standard should specify the manner in which the standard code was to be recorded on that medium.

In still another area, fundamental problems were encountered in sending data across a pair of transmission lines. These were problems such as determining the sequence of sending the bits, the structure of characters within a bit stream and the type of error-detection scheme that was to be employed.

None of these problems can be termed code-sensitive; that is the problems wouldn't be radically different, or even become nonexistent, if another kind of code is used.

Instead, these problems would have been present regardless of the choice of code.

The point is that because of the acceptance of a standard code it became possible to focus the attention of the DP community on these problems and develop standards to handle the relatively arbitrary technical questions which otherwise threatened to further complicate the process of data interchange. In summary, if widespread data and equipment interchange is established as a goal, then probably the fundamental characteristic of the standard code has been its effect on the development of supporting standards to facilitate that interchange.

The cost of converting large files may preclude their being converted to the standard code; however, as new applications are introduced, new files can be constructed with an awareness of the standards that support interchange. Within that set of standards, the standard code has become the keystone.

Kern is a member of the staff of the Industry Standards and Relations group at NCR.

Let's Not Reinvent Stonehenge

Third Generation of Computers Begins With Users

Data processing has a long 4,000 year history, certainly dating back to Stonehenge. It includes the different data processing machines produced by Babbage and son in the 1800s, the Whirlwind machine of the 1940s, as well as the family of machines that grew up in the 1960s.

Yet, all in all, there are presently only three major computer generations. These computer generations encompass all of the data processing systems so far, and I think it is useful to understand them.

The first data processing generation lasted from about 1900 B.C. to 1950 A.D. During this period a number of people had long, complex and worthwhile (on a national scale) calculations that had to be done correctly.

In each case, however, merely being able to get the right answers, without also being able to give greater authority to these right answers than had been previously possible, was fundamentally useless. It simply resulted in stalemates between equally qualified practitioners and consequent instability. The credibility that only an authority — such as a computer — could give was necessary. The four problems involved during this first generation were:

1. The Problem of Unforeseen Eclipses

In early days, the appearance of a solar or lunar eclipse was disruptive to the continuation of smooth government. If the eclipse itself, or at least its probability, could be foretold by the government, then the disruption could be converted from a weakness to a strength. The problem was that there were too many scientists with different solutions, and no real way to tell which was right.

The solution was an official government computer, adopted after at least an 18-year observation and design acceptance test period. Not the best solution, but it was safe since any programming error which occurred later (two cases were found, both involving the shift register) could be solved by putting the programmer to death, perhaps by dropping one of the bits on him. (They weighed a few tons, so this was a real problem.)

2. Incomplete Copying of Tide Tables

In the 1800s, tide tables for numerous parts of the world were being mathematically produced, but inaccuracies in copying the tables could not be prevented. As a result, various ships taking British goods to remote parts of the world were commanded by mariners who often ignored the tide tables if they felt that they could gain some advantage by doing so.

Many British ships were being unnecessarily wrecked, and the national interest was being hurt. Yet the mariners could show that the tables were untrustworthy and so could escape punishment.

The Babbage machines were designed to produce multiple and correct tide tables so that the mariners could not get away with ignoring them. National support was given (around \$10 million 1973 dollars) to the development of the first digital computers, and the copying of the tables was faultless in that power consumption was not taken adequately into account, but a basically analog design solved the problem later.)

3. The Need for Long-Term Reliance on an Unstable Science

In the 1940s, the design of the atom bomb was extremely complex, but was also something beyond the capability of mathematicians to manually hand-check each other's work at a sufficiently certain

level. No 18-year demonstration or partial development (as with Stonehenge and Babbage) was available.

With the use of data processing capabilities both the certainty of successful bomb development and successful bomb testing was much higher than it would otherwise have been, and made the expenditures politically possible. Data processing therefore, perhaps the most expensive "experimental" to take place as it was able to measure political, non-scientific opinion despite the lack of an acceptable demonstration.

4. Continued Use of Known Incorrect Data

In the 1950s the first Univac Systems were installed in the Census Bureau. They failed because the inaccuracy of the census count, and the long delay before its publication were hurting the census bureau's national credibility.

Suspicious that some of the data was being purposely excluded were unavoidable, and a suitable scandal could have pulled the whole census system down. Fortunately, the census system was designed to record certain equipment that could guarantee that errors were accidental and were not deliberately introduced by census bureau personnel. There was a real need for this kind of guarantee, as error rates of up to 5% continue to this day in this area. Others besides those directly involved could check on the accuracy of the operation, and authoritative computer printouts could give credibility.

Same Basic Solution

Conceptually, there is little difference between the slow, manually-operated, one-instruction-per-year, one-machine-code-instruction system at Stonehenge (Move Each Five-Ton-Bit in the Shift Register One Place to the Right), and the Univac 1300-type system with its keyboard, separate tape-reader and keyboard-reader equipment that was installed in the Census Bureau.

Each of the systems was a special system. Each system was designed and built for a special national project. The use of general-purpose hardware in 1950 was only, at that stage, a convenience which allowed greater flexibility of the programs than hard-wired programming systems (such as Stonehenge) permitted. Thus the programmers were necessary when trouble arose as well as honored when it didn't!

This type of data processing, however, changed during the 1960s. The 1950 conviction that computers could never move faster or to much had lost out to the newly discovered utility of general-purpose computers. The increased understanding of the difficulties of programming and operating the computer combined with their potential utility made corporations around the country demand the advantages of in-house computers with their own programming staffs, and the prestige value of being "computerized" made the financial investment worthwhile.

Second Generation

The year 1959 represents the genuine beginning of the second generation of computers. The key event was probably the development of the transistor and its installation in the Univac 1300 state computers. This development made hardware reliability a matter of programming, rather than of engineering. Compatibility was also secured to a considerable extent by the use and development of Fortran, and the adoption of Cobol. Now the general-purpose computer is practically as immortal as Stonehenge.

The IBM 1401, therefore, was the major computer which made the mass use of data processing possible, as opposed to the pre-1960 generation, when only national problems were approachable.

Mass production gave rise to real fami-

lies of computers. Only programs and data structures could be incompatible across the different members within each family, so control of development was handled by programming rather than by the hardware.

During this period, the whole question of what a computer genuinely is was examined. The 1963 IBM produced its "four-life" definition which is the immortal essence of a computer in a nutshell. IBM failed to follow up on its implications at the time, but rather operated under the concept of users changing systems every few years.

The second generation of computers, which lasted from 1960 to 1972, was marked by mass production. During this mass production brought the supply of computers up to equal the demand, and the price of second-hand computers began to drop, even though maintenance and software were available.

The end of this second generation was signaled when the available computer supply started to exceed the demand. In 1968 IBM stopped production of the 1300 and other systems do not grow old. The paycheck produced by a computer that is 20 years old is worth just as much as the paycheck produced by a computer that has just come off the production line.

But a few years later production was stopped on one major computer system after another, starting with the IBM 360/37. But stopping production of one system does not stop using the systems from being used. In fact, by 1970 there existed over \$10 billion worth of computers that could be continued in operation for 10 or 20 years.

User-Controlled Generation

The third generation of data processing is just starting now. Unlike the first generation, more than just national-level problems can be attacked by the third-generation computer. Unlike the second generation, the third generation can concentrate on the data processing task itself, as opposed to the problem of laying physical hands on a computer straight off

the production line (and therefore having to pay the appropriate research, development, production and marketing costs).

Moreover, the signs indicate that during this new third generation the data processor will again have to take real responsibility for the accuracy of *all* their data. The Census Bureau had to lose the control over output accuracy they had during Stonehenge and the Census Bureau generation, but lost during the mass production era. No longer will an answer be acceptable just because it appears on a computer printout.

The signs pointing to this need for accuracy are all around us. The issues being named are Equity Funds, privacy and credit card holders. All these show the need for reassessing the data processing professional's control over the vast capabilities of the hardware, and the lack of a need to put more and more money into hardware instead of into improving the quality of data processing. The inability of the computer builder to provide quality data processing is attested to in the abstract forms which don't even guarantee that the operating systems or the compilers are harmless.

I hope the users see their new control wisely. I hope they start putting accuracy before newness, quality before brand names. Only by building quality into our systems can we hope to achieve the real advantages that data processing has to offer the world. Without quality the world will not trust in its instant problem-solving and the lessons of Stonehenge — that is not enough to be right, it must also be obvious that errors are avoided — will once again have to be learned painfully, as usual.

We've reinvented the wheel too often already, let's not reinvent Stonehenge!

© Copyright 1973 Alan Taylor. Reproduction for commercial purposes requires written permission. A limited number of copies for non-commercial purposes may be made provided they carry this copyright notice. The contents of this column do not necessarily reflect those of Computerworld.

ONE DP MANAGER SAID

"THE BEST NEW EQUIPMENT WE EVER HAD"

LET US PROVE THAT

ADD-ON MAIN MEMORIES

for the IBM

/360 - 65, 65MP, 67, 75 and

/370 - 155, 165 SYSTEMS

OFFER UNEQUALLED VALUE

in — DESIGN FEATURES

— COMPACTNESS

— COMPATIBILITY

— PERFORMANCE

— AVAILABILITY

— COST

— SUPPORT

CALL OR WRITE:

INTERMEM

CORPORATION

MARSH STREET
WAPPINGERS FALLS, N. Y. 12590
TEL: 914-297-3996

— THE SYSTEM ENHANCEMENT COMPANY —

SOFTWARE & SERVICES

Random Notes

Report Facilities Improved By 'Total/Culprit' Update

BOSTON — The Total/Culprit output processor from Cullinane Corp. has been extended so users have more flexibility working with Cimcon's Total data base management system. Now, for example, users can now available within the entire Total record, including the root and linkage segments.

A file definition subsystem provides the ability to catalog files and field definitions into Total data sets which, Cullinane said, eliminates the need to define logical fields in report parameter cards. The initial driving file in a path through the data base can be read either serially or directly, the company added from One Boston Place, 02108.

Xerox Computer Opens Office

NEW YORK — Xerox Computer Services has opened offices at 767 Fifth Ave., here, and at 190 Moore St., in Hackensack, N.J., to serve the New York, New Jersey and Connecticut areas.

This expansion, following the mid-March opening of an office in Chicago, allows the company to provide coast-to-coast service to users with multiple locations. XCS is currently expanding its library of application programs so users need not go through a heavy software development cycle to use the system.

Security Data Tops Extended

NEW YORK — Interactive Data Services Inc. has expanded the number of securities listed on the daily Investment Statistics Library (ISL) tapes.

The ISL tapes now include pricing data on 15,000 corporate bonds traded over the counter, bringing to approximately 25,000 the total number of securities carried on the tape. Working through a 360/40 in downtown New York, the company is able to get the magnetic tapes of the current day's trading to some users by 6:30 p.m., a spokesman claimed.

Retail Plans Sunstated

FT. LAUDERDALE, Fla. — Property developers and management of retail chain stores can determine the potential sales value of various locations before they start building through the Retail Sales Site Evaluation System service now offered by Creative Realty Concepts Inc.

Factors used by the basic simulation programs are customized to the type of retail outlet the user is considering, and the tables reflecting the buying patterns of specific areas are maintained by Creative. Basic simulation charges for the use of the system and the user is also responsible for the computer charges accrued when his run is processed, a spokesman said, from 1385 E. Oakland Park Blvd., 33308.

Nobody Schedules Multiprogramming the Maximum Advantage Way... Except Our Customers

Value Computing's customers have a tool, our Scheduling System, in the hands of their schedulers that pays off big. With Value Computing, schedulers don't just schedule, they also optimize the loading and balance of the entire computer system. Benefits frequently experienced are:

• productivity increases of 20-40%

• savings of hundreds of thousands of dollars

Task Group Survey Finds

Government Users Avoid Switch to Ascii

By Don Lovitt
Of the CW Staff

WASHINGTON, D.C. — The American Standard Code for Information Interchange (Ascii) is being used by government agencies for those files and other data streams that are being interchanged, but there is continuing operations-level resistance to converting non-interchangeable files to Ascii. A preliminary report of Federal Information Processing Standards (Fips) Task Group 12 (TG 12) also shows that interchange of information between agencies is still minimal and, as a corollary, the use of Ascii is also at a low level. Most agencies answering a TG 12 questionnaire indicated that it was the bulk of their work to convert fixed data files to Ascii, carried in whatever native code their computer configuration utilized, or in an ear-

lier code being handled under emulation.

The failure to go to a common code could cause real problems in case of natural — or man-made — disasters since programs and files are not now transparent to other sites if the need should arise. This lack of interest in self-protection by government agencies is unfortunate, typical of major industries and business, the TG 12 report noted. TG 12 suggested that it hoped they might now at least recognize the problem and the potential solution offered by Ascii usage.

Review Board

TG 12 was formed last fall to review the effectiveness of requiring governmental agencies to use Ascii in interchange situations, a directive that has been in effect since 1969. Under Fips Publication 7

(PUB 7), government installations were called on to include Ascii interchange capability on all new systems proposals. Most of the agencies that have sought new equipment since then have complied with that requirement.

An interesting finding of the TG 12 questionnaire, according to a task group member, has been the amount of government DP work still being done on second generation equipment developed before Ascii was established. On the other hand, gear working in emulation mode.

The push for Ascii in 1969 was intended to get as many government installations as possible to work in a common code, but the effort apparently was too gentle. Promulgators of Fips PUB 7 saw it as a means of protecting agencies against disaster by allowing complete transfer of programs to alternate sites.

Drive Stalled

But, the TG 12 source noted, the directive keyed only on the idea of common code for interchange of information, and since most agencies don't swap information to a great extent, the Ascii drive has been almost stalled. The provisions of Fips PUB 7 that allow waivers of the Ascii requirement are currently so vague that any diligent DP supervisor probably apply them to situation if he feels so inclined, the task group noted.

Impetus to shift to Ascii for efficiency, protection against disaster, or for any other reason has to come down from the management of a DP installation, not up from the operations staff. The shift probably should be a time-phased effort and will involve considerable time, effort and money, but it would seem to be worth the cost, the preliminary report suggests.

User's Source Program Studied; 'Metadata' Creates Dictionary

EL SEGUNDO, Calif. — DOS/360 users moving toward a full data base management system can gain control of their files and possibly improve the structure of their applications with the Logic Metadata System, now available from Logic Systems. In its current form, the Metadata system is a data directory and dictionary which analyzes where the user's data is, what programs would be affected by a change in a data element, and similar planning functions.

Even though the full-blown data base management system isn't ready yet, data can be accommodated by the Metadata system in the user's choice of Cobol, Fortran, PL/I or Assembly language through a separately priced host language interface module.

Capabilities

Descriptive information is entered on descriptive cards provided in unique specification sheets, or as data definitions from Cobol source programs, on cards or from the user's Cobol library. Any of these entries can be modified later to keep them current, the company said.

Running all of the existing programs against the system provides the user with a listing of every place in every application program in which a data element is stored or edited. In addition, the narrative capability can be used to specify the sources and end users of each element.

The communication can make it easier to identify relationships in data already stored and, in some cases eliminate the need to write new programs to generate data, since the user may find the data he wants already exists, a Logic source said.

The system is modular and is designed

to run in a 64K DOS partition. The minimum configuration consists of the Metadata Base and the Data Description Module, a combination which can be licensed for a one-time charge of \$7,500.

The system is currently available for modules for describing a data base or file structure, source inputs and reports, and processing functions, in addition to the minimum Metadata elements. This larger system is available for a total of \$18,000, including maintenance, training and several utility programs.

The firm is located at Suite 136, 931 S. Douglas St., 90245.

DEC Enhances Basic for PDP-11

MAINYARD, Mass. — PDP-11 users can have up to 15 times faster throughput working with Basic programs controlled by either of two new language processors now available from DEC. But there is a price — literally — for this improvement since the new Basic are licensed products.

Basic PTS (Paper Tape System) is a core-only single-user Basic designed for use by generalists in interactive environments. RT Basic PTS is a real-time extension of the simple system, with 20 real-time commands, and is intended to supplement DEC's Laboratory Peripheral System (LPS-11) that links PDP-11s to tape media.

Basic uses simple English-like statements and familiar mathematical notations to perform various operations. Basic PTS features an optional string capability that enables core-conscious users to eliminate that support and reclaim program space

when string manipulation is not needed. The new Basic also provides a CALL subroutine that allows easier interfacing with assembly language, and interrupt-driven support for a line printer and high-speed paper tape devices. Several PDP-11 floating point options are accessible under the Basic PTS logic, a DEC spokesman added.

RT Basic PTS and LPS enable the user to monitor various environments, specifying sampling rates and duration of the experiments. The software has modularity similar to that of the hardware so core used by the system is kept to a minimum, and the application program can utilize more space with an optimum of efficiency, according to the company.

Basic PTS and RT Basic PTS are available from DEC through license for one-time charges of \$500 and \$700, respectively.

Scheduling Tools for

OS/MVT and VS1
OS/MVT and VS2
DOS and DOS/V

Value Computing Inc.
498 King Highway North
Cherry Hill, New Jersey 08034
I'm Interested in More Details:
 About Your Computer Scheduling Systems
 Have a Salesman Call
 I Don't Believe You, But I'll Listen

Name _____
Title _____
Company _____
Address _____
Telephone _____ ZIP _____



Value Computing Inc.
498 King Highway North
Cherry Hill, New Jersey 08034

Grandson of Dracula?

NEW YORK — An interactive software system developed by Blood Bank Management Corp. (BBMC) enables hospitals to control blood bank inventories and "sharply reduce" the number of units of blood lost because they are unused while still fresh.

The Fortran-based application can be installed on a using hospital's in-house CPU or accessed through the Boston-based timesharing service of Computer Inc.

It supports order quantities for all supplies used by the blood bank and provides a daily patient billing report for the accounting department. In addition, complete individual patient records are maintained for retrieval whenever the particular patient again utilizes the blood bank.

The prior record and answers to newly-posed questions are combined by the system to determine the oldest unit available for cross-matching.

Community timeshared implementation has the potential of supporting inventory sharing between hospitals or a master listing of all donors within a community so that emergency situations can be handled effectively, BBMC added.

The software requires 60K characters of core on Compat's Decsystem-10 but probably can be adapted to different configurations as long as the target CPU supports an on-line Fortran compiler.

BBMC is at Suite 303, 370 Lexington Ave., 10017.

'PBP' Uses Standard Coding Schemes In Handling College Administration

PISCATAWAY, N.J. — Colleges and universities with any of several CPUs can avoid the effort of developing their own administrative applications and, at the same time, work with code schemes compatible with common classification structures, if they install the Payroll, Budgeting, Personnel (PBP) system from Integral Systems Inc. (ISI).

PBP is designed to solve many problems that are unique to a college or university environment, including the tighter fiscal controls now imposed by various governments and funding agencies, and the often complex payroll distribution and cost accounting required by the institute's various faculties and supporting staffs.

PBP is made up of three independent but interchangeable modules, each having file maintenance and reporting phases.

All modules are essentially "table-driven," working from the Control Tables File, which is accessible to the user, and which can shape the processing to the needs of his institution.

The data encoding used by the system conforms, where possible, to Western Interstate Commission on Higher Education (Wiche) and Higher Education Survey (Hegis) taxonomies, allowing the user to maintain information compatibility with other institutions of higher education.

General Information Survey (Gis) taxonomy, allowing the user to maintain information compatibility with other institutions of higher education.

Indicative of just how unique are the approaches used by some of these institutes is the cross-checking done by PBP to determine which departments are over-committed on salary.

The system can, if desired by the administration, prevent the issuance of paychecks if funds just aren't available. Similar lockouts can be imposed against individual employees who have overused their sick leave, vacation or personal leave allowances, ISI said.

PBP runs in 54K under DOS/360 or in a 90K region under OS, but has also been adapted to work under Burroughs' MDP and Unics, Exec-8 environments. ANS Cobol source code is provided with all modules.

Prices range from \$10,000 to \$60,000, depending on the modules selected and the specific installation support requirements of the user. LSI is at 82 Lenox Court, 08854.

See our new CHAIN/TRAIN™ line printer

It's the newest addition to our popular family of medium-speed line printers now being delivered to satisfied OEM customers throughout the world.

This 300 LPM Model features the economy of a chain printer with the precision of a train printer. The unique CHAIN/TRAIN is composed of character links which ride on a mono-rail track, thus insuring unsurpassed alignment, superior print quality and solid dependability.

A no-nonsense printer, it has one hammer per column. There is no shunting of paper or hammers and no sharing of electronics. As a result, this heavy-duty unit will completely satisfy your most demanding requirements.

See us at NCC Booth # 1512 or contact Frank Schaller for complete details.



**Compact,
Low-cost,
We deliver!**

Data Printer Corp.

201 Vassar Street, Cambridge, MA 02139 (617) 492-7484

Mohawk 2400 Gains Concurrent Tasking, More Hasp Support

UTICA, N.Y. — New support, primarily software, has been introduced by Mohawk Data Sciences to make its System 2400 more competitive. The enhancement hasn't actually added to the types of tasks that can be handled by the units, but it has allowed several tasks to be conducted concurrently.

Until now, the 2400 has been either a remote batch terminal, a stand-alone "peripheral processor," or a key-to-disk entry system, depending on the configuration. The tasks could be user-selected and changed on the fly, but at any given time all visual displays and keystrokes in a 2400 system were "dedicated" to the same operating mode.

Now, concurrency support software allows the combination of key-to-disk entry operations on the 2409/1 processor with one of three remote job entry concentrators, or with the Pactor tape-to-print utility program. RJE support includes the choice of 360/20 Hasp, IBM 2780 and IBM 2968 tape-to-tape communications.

The 360/20 Hasp emulator has been expanded to allow communications from one MDS system to another, the spokesman added.

Other communications packages in Mohawk's collection of bundled software include Gert, an emulator for use with large Honeywell/GE CPUs, and Mohawk Data's Advanced 2400, which allows the 2400 to handle up to 8 synchronous communications lines when used with the new 2429-1 concentrator.

Other software now includes an industry-compatible RPG II language processor, enhanced to provide faster throughput; a tape monitor system for job stream control on user written programs and general purpose utilities; and a faster sort/merge package with READ BACKWARD tape capabilities.

Data Base System Guide Now Available From Q.E.D.

WELLESLEY HILLS, Mass. — The 340-page guide, *Data Base Management Systems: A Critical and Comparative Analysis*, describes the similarities and differences of various data base systems, including IBM's IMS, Cincom's Total, MLI's Systems 2000 and Software AG's Adabas [CW, Feb. 28].

Developed jointly by Performance Development Corp. and Q.E.D. Information Sciences Inc., the book is available from Q.E.D. for \$385, and includes updates through the end of 1973. Q.E.D. is at 170 Worcester St., 02181.

GROUP/3 ANNIVERSARY OFFER

THIS OFFER EXPIRES JULY 1, 1973

BUY NOW AND SAVE!!!

DISK CARTRIDGES



5444, new and fully warranted.

only \$105

SAVE ON DISK PACKS



5445, new and fully warranted, useable on all 11-high drives.

only \$190

RIBBONS



5 mil nylon.
5203 Mod 10 printer ribbon,
only \$12
each

5213 Mod 6 printer ribbon, (spool type only)
only \$13
a doz.

1403 Mod 2 high speed printer (or NI), only \$13 each
(\$144/doz.)

5471 cartridge for electric printer-keyboard, (fits any electric typewriter) only \$15 a doz.

ORDERING INSTRUCTIONS

Your check must accompany order.

All shipments are prepaid in the continental United States, freight collect otherwise.

California residents add 6% for sales tax.

for further information, call 800-421-0702...toll free. In California, call 213-653-1833.

MAGNETIC TAPES SAVE NOW!

New, fully warranted and fully certified (3200 fci) Prices are for cases of 10 reels.



In cannister
2400 ft.
only \$110

1200 ft.
only \$90

In tape seal
2400 ft.
only \$105

1200 ft.
only \$85

OR SUBSCRIBE NOW AT HALF PRICE AND SAVE ALL YEAR!

If you want to take advantage of these price discounts throughout the year, you can subscribe to Group/3 for only \$120 or just half the regular subscription rate. But you must do so by July 1!

ACT NOW

Please invoice my company for \$120 for a full year's subscription to all Group/3 services. I understand this is a saving of 50%.

I am enclosing an order for products at Group/3 discount prices. I understand I can place this order up to July 1 whether I subscribe to Group/3 or not.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____

THIS OFFER EXPIRES JULY 1, 1973

GROUP/3

6399 Wilshire Blvd. Los Angeles, Calif. 90048

Data Briefs

\$1,500 CRT Display System Available From Lear Siegler

ANAHEIM, Calif. — Lear Siegler is offering a \$1,500 CRT display system.

The ADM-1 terminal has a display format of 960 characters (12 lines of 80 characters), using the 64 alphanumeric Usascii character set in a 5 x 7 dot matrix. An optional 1,120-character screen (24 lines of 80 characters) is also available.

The terminal is designed for EIA RS232 point-to-point interfaces at rates of 110 to 9,600 baud.

First production units of the ADM-1 will be delivered in late September from 714 N. Brookhurst St., 92803.

Syntech Modem Bell-Compatible

ROCKVILLE, Md. — Syntech has a Bell 202-compatible modem with EIA interface displays.

The TT-202 provides asynchronous (up to 1,800 bit/sec) or synchronous (at 1,200 and 1,800 bit/sec) speeds for 2-wire half-duplex or 4-wire half- or full-duplex.

The TT-202 is suitable for either dial-up or private-line use, the firm said.

The TT-202 has LED displays that show the status of the terminal/modem EIA interface. Data terminal ready, data set ready/ring indicator, clear to send, transmit data, receive data and carrier detector are all indicated.

The modem costs \$425. Delivery is from stock from 11810 Parklawn Drive, 20852.

Modem Card for Sale

TARZANA, Calif. — Novation, Inc. has a modem card for sale in the \$50 range. The 103F-compatible card is intended for use in multipoint polled data nets. It has answer or originate mode frequencies, carrier detection and request to send.

The unit operates on 4-wire private lines. Novation claims it requires a minimum of filtering.

Delivery is 30 days from 18664 Oxford St., 91356.

Modern Tester Spots Failures

FORT WASHINGTON, Pa. — Teledynamics, Division of Amherst Industries, is offering the 7914A Data Set Tester for nonsynchronous and synchronous data sets. It interfaces directly via EIA connector (male and female supplied).

The unit can implement a number of tests to isolate equipment failures or evaluate system performance. The tester can be operated in nonsynchronous or synchronous modes and the simplex, half-duplex or full-duplex modes. Data rates may be 150, 300, 1,200 or 1,800 bit/sec in nonsynchronous applications and up to 9,600 bit/sec for synchronous applications.

Prices are \$495 from 525 Virginia Dr., 19034.

COMMUNICATIONS

35% Savings Seen

RCA User Group to Share AT&T Lines

By Ronald A. Frank

Of the CW Staff

NEW YORK — A joint user group that could provide data users savings up to 35% less than comparable AT&T circuit services has been formed by RCA Corp.

To be administered by RCA Global Communications, the joint user service will use time-division multiplexers to subdivide 3002-type voice-grade data channels leased by AT&T.

Initially, the nationwide service will be available in New York, Chicago, Detroit, San Francisco and Los Angeles, but users will be able to link into these user group metropolitan cities by means of local loops or longer distance Bell facilities.

Joint-Use Provisions

The joint users group will operate under the sharing provisions of AT&T tariff 260 which provides for joint-use services. Under these joint-use provisions, one user (in this case RCA) acts as the AT&T customer and has overall control of the group's operations. RCA will also operate and maintain the multiplexers that will allow users to share the Bell facilities.

Although the exact circuit capacities of the user group will depend on customer requirements, up to 75 low-speed lines can be derived with multiplexers from one 4kHz wide-grade channel, according to RCA. The initial system already in-

cludes seven users who have subscribed for 25 of the available lines.

RCA Global Communications will sign up users for one-year contracts with 60-day cancellation privileges.

Although specific savings will depend on the size of the joint user group and the amount of Bell facilities in service, some comparisons are possible.

Based on a 30-circuit network, a 1,000-mile link would cost \$7,500/mo for a joint user customer compared with \$11,000/mo for a user who went direct to Bell. The costs are based on a 75 bit/sec circuit, RCA said.

The More the Cheaper

An interesting side benefit to users will be the prospect that rates for individual lines will drop as more customers are added. The rate structure for the user will be based on first dividing the cost of the basic channel among those using it.

In addition, RCA will add an access charge and a mileage charge for its services. But the net result will mean savings of at least 25% or more for most customers.

On a New York-to-San Francisco link, a Bell user with 75 bit/sec service would pay \$1,361/mo while a joint user group customer would pay \$940/mo for the same capability. The RCA charges would

include \$640 mileage charges and \$90 for access charges (\$45 at each end). The joint-use mileage charges will range from 20 cent to 40 cent/mi/mo, depending on the length of the line.

Although RCA as the joint user administrator will collect all bills, users will receive separate statements from AT&T notifying them of their allocated costs of the shared facilities.

And RCA will also act as interface with the phone company for the user. This means that RCA Global will assume end-to-end maintenance responsibilities for the user, RCA said.

The initial five-city network is expected to begin operations "within the next seven weeks." The system will include Codex, a firm that has installed data link facilities installed at AT&T sites in the five cities.

Eventually the system could grow to 35 cities, depending on user acceptance, an RCA spokesman estimated.

Initial customers for the user group include RCA Corp., Mitsui Bank Ltd., The Tokai Bank Ltd., NYK Line Inc. and Sanwa Bank, all of New York. Other users include Electronic Memories & Magnetics Corp., Hewthorne, Calif., and Retta Steamship Co., Long Beach, Calif.

Information concerning the joint user group is available from Kenneth E. Ryan, RCA Global, 60 Broad St., 10004.

Bell Plans Modems and Expanded DDS

BOSTON — A new family of Bell data sets, increased capabilities for the Data-

phone Digital Service (DDS) and an alterna-

tive for Telpak service were among the AT&T plans revealed at the recent Interna-

tional Communications Association (ICA) conference here.

The new data sets will utilize TELI tech-

nology and will cover "a more limited

number of products" that will correspond

to the speeds of the DDS network, ac-

cording to Carl Stuehrk, operations di-

rector of service plans for AT&T.

The modules listed by Stuehrk included a 2,400 bit/sec "modem" for the 201A and scheduled for the third quarter of 1973.

Also mentioned were a higher-speed 9,600 bit/sec data set, reportedly to be designated the 209, and a modified 202-type modem. And current AT&T specifications show a dial-up version of the 4,800 bit/sec 208 data set to be designated the 208B and scheduled for delivery in the third quarter of 1973.

With TELI technology in its 9,600 bit/sec data set, it will also support the higher data speed as a service offering, Stuehrk said. Users who now transmit at 9,600 bit/sec on the dial-up network with independent modems often encounter service support problems from their local phone companies. But a Dataphone 9600

offering from AT&T could help such users.

The DDS enhancements for the service scheduled to begin early in 1974 are subject to regulatory approval. They include "intrastate service on a selective basis," Stuehrk said. Work is also "well under way" on a proposal for an interstate filing for DDS and a tariff will be filed "in time to meet the proposed service."

With possible FCC approval of the Bell DDS application by June 1, 1973, installation of equipment between New York and Bell 202 will "commence immediately" to meet the projected start-up date of Jan. 1, 1974. The initial service will be for private-line point-to-point users, but multipoint capability will be added in late 1974 and "a switched digital version is under study."

The proposed alternative for Telpak bulk rate tariffs was mentioned by F.P. Stoddard, AT&T's marketing director for private-line services. The offering would be called "Hi Pak" and would apparently be based on a high-density rate centers included in Bell's recent high-density, low-density revision for its private-line tariffs.

The Hi Pak would "use the basic rate structure" from the high/low plan and would "confine Telpak-like cross-sections

primarily to the high-density network," Stuehrk said.

In a related remark during an AT&T presentation at ICA, a Bell official said the company was looking at Telpak "to increase the rates," possibly "by the end of this summer."

With anticipated 370 high-density rate centers appearing, Hi Pak will be expanded, Stuehrk said, estimating that about five to six per year would be added.

Intertel Has Modems For Bell 103F Users

BURLINGTON, Mass. — A pair of integral modems which provide full Bell 103F-compatible operation at speeds up to 300 bit/sec over two-wire private lines has been introduced by Intertel, Inc.

The Model 1038 is an Originate mode unit, while the Model 1039 operates in the Answer mode. Standard for both is a 103F line. The modems are full duplex, with a maximum of 300 bit/sec per channel over dial-up or private lines. Both units are designed for use with a variety of CRTs, monitors, and all sorts of computer terminals. The modems are designed to work with a variety of data rates, up to 300 bits per second or five times that rate.



World's First 1200 Baud Full Duplex Two Wire Modem

vadic



6007

The IBM 1130 - if you have one, keep it; if not, get one!

LIBERATE the inherent power and capability of the IBM 1130 System with Logicon enhancements — add-on core, high-speed printers, disk drives, tape system — increase the throughput up to 10 times and still enjoy the confidence that is yours with an IBM CPU and IBM maintenance.

INTERFACE your 1130 with up to 32 terminals simultaneously — CRTs, teletypes, analog or digital sensors, IBM selectrics, keyboards, counters, time-of-day clocks, etc. — with the LI/ON (Logicon Input/Output Network) designed specifically to let you communicate with the 1130.

SAVE dollars on your computer operations. In many cases, Logicon enhancements combined with the reliable, powerful IBM 1130 system will permit you to do much more work for much less money than you are now spending.

NO MODIFICATIONS are necessary with Logicon 1130 add-ons and peripherals. You don't have to violate the internal hardware integrity of your IBM 1130 system nor are source program changes required. All operations are within the framework of the disk monitor (DM2) system.

LOGICON is the world's largest supplier of IBM 1130 enhancements. Logicon peripherals, add-ons and communications interfaces are 100% compatible with the IBM 1130 system because they are specifically designed for the IBM 1130.

WHERE do you find out more about how you can continue to enjoy IBM dependency and service and still reap the benefits of increased throughput, greater capacity, higher speed, job flexibility and a lot more at a low, low cost. Call or write one of our nationwide offices listed below:

LOGICON/INTERCOMP

24225 Garnier Street, Torrance, California 90505
Telephone (213) 325-6060

AMF O'Hare, P.O. Box 66562, Chicago, Illinois 60666
Telephone (312) 671-5455

6200 Hillcroft, Suite 112, Houston, Texas 77036
Telephone (713) 772-6636

99 Jericho Turnpike, Suite 301, Jericho, N.Y. 11753
Telephone (516) 997-3888

AMF Cleveland, P.O. Box 81142, Cleveland, Ohio 44181
Telephone (216) 777-6648



Teller System Based on LSI Processor

DETROIT. Mich. — Burroughs has introduced a processor-oriented terminal system designed for banking and financial users.

The DC 140 is an LSI processor which provides operating and control logic for a variety of teller and administrative terminals. The processor is part of the TCS 1000 terminal computer system which can operate at remote sites connected on-line to a central mainframe.

The TU 700 teller terminal is part of the TCS 1000 system and can be used for teller, auditor, supervisor and similar banking applications. The TU 700 has automatic passbook reading and includes both numeric and alphanumeric keyboards. The earlier TU 500 for cash and audit control will also operate with the TCS 1000 system.

The DC 140 is a C600-oriented CPU that can be used in the TCS 2600 Burroughs system. It has a maximum storage capacity of 64K characters and can be configured in modular memory increments from 4K to 44K characters

depending on terminal system configuration. The processor has two data communication channels that can transmit simultaneously from remote terminals to the CPU.

Both the TU 500 and the TU 700 can read magnetic stripe coded cards for electronic funds transfer systems. The DC 140 can also be used to control TD 700 and TD 800 inquiry display terminals, RT 2000 cash dispensers and RT 4000 remote teller systems.

Both read TU 500 stripe and TU 700 can read magnetic stripe coded cards for electronic funds transfer systems. The DC 140 can also be used to control TD 700 and TD 800 inquiry display terminals, RT 2000 cash dispensers and RT 4000 remote teller systems.

A typical TCS 1000 system including five TC 700s and 10 TC 500s with DC 140 will cost about \$6,000/terminal using numeric-only terminals, a typical TCS 1000 system of four alphanumeric TC 700s with a DC 140 will cost about \$10,000/terminal. First deliveries are scheduled for the fourth quarter of 1973.

If your company has an IBM 370 computer system on order or is considering ordering one in the near future, explore the leasing terms available from DPF.

Consider what DPF Inc., the largest independent System 360 computer lessor in the United States, can do for you: **Time-Tailored Leases.** DPF offers both short-term (as short as three years) operating leases and long-term (as long as ten years) full-payout leases. We help you choose the term that best fits your requirements.

Flexibility. All DPF leases contain provisions which permit you to change your arrangement should your data processing requirements change at any time during the term of the lease.

Full Service. DPF doesn't forget you once your hardware is in place. From its vast resources and experience (almost a quarter of a billion dollars of 360 computer inventory presently installed) DPF provides you with continuing hardware and software support throughout the term of your lease.

Peripherals, Too. DPF leases cover your complete data processing system, including non-IBM peripherals you may select. **Competitive Costs.** Compare the cost of leasing 370 equipment from DPF with any other figures you may have. You'll be delighted.

So, you see, the short-term operating lease did not die with the advent of the 370. It is alive

'Savings to \$8,000/Yr'

Display System IBM-Compatible

By Patrick G. Ward

Of the CW Staff

BETHEL, Conn. — Computer Optics, Inc. has introduced an information display system that is plug-to-plug compatible and software interchangeable with IBM's 3270 display system.

The firm claims the CO/77 provides the user with cost reductions and performance advantages over the IBM 3270.

User savings are in direct proportion to the number of displays in the user's total system, according to Computer Optics. The firm stated "user savings can range from \$2,000/yr. on an existing 8-station system, to over \$8,000/yr. on a typical 16-station configuration."

The CO/77 can be ordered in complete terminal systems or as modules for incorporation into existing systems.

The system includes a display station with a desk-top video display module and movable keyboard, plus a control unit.

The CO/77 display station is offered in

480-, 960- and 1,920 char./screen sizes, the smallest unit having 40 char./line and the larger two, 80 char./line. The "dual case option" offers both upper and lower case characters on the largest screen.

Computer Optics is also offering a separately priced character printer and line printer with the CO/77. The character printer provides upper and lower case at 30 char./sec on a 132-1/2 in. line.

The page printer transfers an entire screen image to an 8-1/2 in. by 11 in. sheet of paper.

No prices were available from the firm. The CO/77 system will be available for delivery in the fourth quarter of this year. Computer Optics is at Berkshire Industrial Park, 06861.

Data Briefs

GTE Modifies Data Set

SAN CARLOS, Calif. — GTE Lenkurt has announced modifications to its type 26D data set.

The firm said changes to the 4,800 bit/sec modem include advanced recovery and error detection and correction. The development of a switchable compromise equalizer and automatic carrier phase adjustment circuitry has simplified both prequalification and post-qualification of data networks, according to the firm.

The 26D costs \$2,700 from 1105 County Road, 94070.

Terminals Convert to Telex

HAUPPAUGE, N.Y. — Multiplex Communications Inc. is offering an adapter to convert terminals to the Telex network.

The firm said its CU 300 interface package will enable the use of any five-level teletypewriter or other terminal on the Telex network.

The adapter contains an operator control panel with a rotary dial, sonalert and operating switch indicators, plus a line interface.

Price of the CU 300 is \$133 in OEM quantities. Delivery is 90 days from 123 Marcus Blvd., 11787.

Converter Translates Ascii Baudot

ITASCA, Ill. — Nation-wide Electronic Systems has a code converter that translates 8-level Ascii tapes to 5-level Baudot output.

Along with the new CC 1038MR code converter, Nationwide offers the CC 1035MR, which converts 5-level tapes to serial 8-level Ascii.

The code converters include mechanical tape reader, all translating circuitry and an output circuit for constant current.

The converters can drive tape perforators, teletypewriters or communication systems.

Price for either model is \$1,845 with a four to six week delivery from 7H662 Route 53, 60143.

Device Switches, Monitors Data Set

PROVIDENCE, R.I. — International Data Sciences, Inc. is offering its Model 8501 data patching and monitoring module. It allows the user to switch, patch and monitor all 25 leads of the EIA data interface.

The 8501 displays transmit data, receive data and data carrier detect signals through LED indicators.

When the unit's front-panel switch is in the normal position, the interface appears on a front-panel EIA connector for monitoring.

In patch position, the normal connections are broken and the leads from the rear-mounted connectors are transferred to the front panel for testing, or for channel-to-channel patching.

The Model 8501 costs \$145 with immediate delivery from 100 Nashua Street, 02904.

When they say you can't get a 3-year operating lease on a 370,

tell them about DPF



EDOS

CONTINUES TO GROW! ...BY EXTENDING YOUR 360!

■ APRIL 1972: Performance Enhancements and Six Partition Support

PERFORMANCE

Users throughout the world are experiencing overall throughput improvements of 25% from the Basic EDOS package alone. Features such as Blocked Status, Resident Transfers, CPU Load Balancing, and the Fast Linkage Editor are included in Basic EDOS.

OPERATIONAL EASE

Features such as Automatic Volume Sensing, Program Relocation, Dump/Restore, and the flexible Procedure Library simplify the operational environment.

COMPATIBILITY

EDOS is 100% compatible with DOS. All IBM distributed

programs and all user written programs operate without modification. No changes to JCL, data files, programs are required.

SIX PARTITIONS

Provides twice the partition availability. It is like having another C.P.U. Run whatever you want in any partition.

■ JANUARY 1973: Extended Spooling

PERFORMANCE

The fundamental design criteria for Extended Spooling was superior performance. To achieve this goal, this facility was integrated into the EDOS nucleus, not added-on as additional overhead in the form of a sub-system. The management of both main memory and DASD space is automatically performed to insure maximum performance. EDOS Extended Spooling gives a new dimension to the term performance. Performance of up to 50% improved throughput over any other spooling system available.

MINIMUM MAIN MEMORY

The integrated design of Extended Spooling avoids duplication which minimizes main memory requirements.

- 2K Resident Main Memory
- 2K per Device— Dynamically Loaded When in Use
- As many pseudo devices as required without charge

DYNAMIC DASD MANAGEMENT

Extended spooling requires ONE-HALF the disk space required by other Spooling systems. Extended Spooling DASD Management features include:

- Complete Record Compression

- Shared Buffer Area
- Dynamic Space Allocation
- Early Start Facility
- Generic Queues

OPERATOR FEATURES

Extended Spooling functions automatically without operator intervention. A host of operator control and flexibility features include:

- Automatic Device Assignment
- Cascading Abbreviations
- Variable Number of Tasks
- Interrupt Driven Utility
- Automatic Warm Start
- Full I/O Accounting
- Dynamic Output Buffering

■ JUNE 1973: 360/370 Compatibility

The 360/370 compatibility facility provides the complete 370 instruction set for the 360. Run any 370 program on the

360. The data processing industry's 370 development effort is now available to the 360 user! New compilers, sorts, application

programs that are written only for the 370 can now be run on your 360.

EDOS is...Support...Inexpensive

EDOS is a continuing series of system releases offering coordinated extensions to DOS providing improved performance and operational characteristics. EDOS was developed under the direction of Jerry Enfield, the co-author of the Compatibility Operating System (COS), which has been used by over 4,000 360 users.

SUPPORT

EDOS is continuing systems software support for the 360 user: EDOS users continue to

receive without charge complete maintenance. Continuing support not only in terms of maintenance, but a continuous development plan of powerful extensions, such as have occurred during the past year.

INEXPENSIVE

EDOS is inexpensive. With all of the features and performance that EDOS provides, its compatibility and ease of installation, you will want to evaluate it in your own installation. We frankly believe you will agree that EDOS is the

most exciting systems software available. A 60 day free evaluation period is provided. In lieu of the 60 day free evaluation period The Computer Company will install EDOS on your system without charge. The Basic System Release 5 of EDOS has a lease price of \$225.00 per month. Six Partition Support has a monthly lease of \$75.00; Extended Spooling has a monthly lease price of \$200.00.



THE COMPUTER COMPANY

7th & Franklin Building - Richmond, Virginia 23219 - (703) 644-1841

SYSTEMS & PERIPHERALS

Bits & Pieces

HP Calculator Accepts Marked/Punched Cards

PALO ALTO, Calif. — Hewlett-Packard has a card reader that enables users of the HP 9800 programmable calculator to use marked and/or punched cards as a data entry medium.

The Model 9869A Calculator Card Reader reads 18-character Hollerith code and converts it to 7-bit ASCII for input to the programmable calculator.

Marks punched holes or even pre-printed marks can be randomly intermixed. Cards in either 40- or 80-column format can be read. Cards without clock marks can be read using an encoder option.

Cost of the card reader is \$2,775. Options available include: 500-card hopper, \$25; reject/select hopper, \$200; encoder for cards without clock tracks, \$200; and a bell, \$50.

Deliveries are scheduled to begin in June from 1501 Page Mill Road, 94304.

Floppy Disk Attached to Minis

BEDFORD, Mass. — Innovex Corp. has an interface which connects the firm's "diskette" (floppy disk) moving-head memory subsystem to PDP-8 or PDP-11 minicomputers.

Mounted in the diskette formatter cabinet, a single interface card will handle up to eight floppy disk drives.

The interface contains all the control registers, disk address register, memory register, formatter control sequencing logic and interrupt control needed for disk control, a spokesman said.

The interface bought separately costs \$200. A complete floppy disk subsystem ready to plug into a PDP-8 or PDP-11 is priced at \$2,740 from Four Alfred Circle, 01730.

Add-On Unveiled for DDP-516

SUNNYVALE, Calif. — Advanced Memory Systems (AMS) has announced a series of plug-compatible solid-state main memories for Honeywell's DDP-516 line of computers.

Access time for the AMS memory is 425 nsec and cycle time is 980 nsec.

The basic 4K bytes can be expanded linearly to 16K bytes with the HIS DDP-516 system enclosure, through an "add-on" memory storage board that requires no additional power supply modification, the firm's spokesman stated.

Expansion to 16K bytes up to 64K bytes — can be configured by AMS on special order, still within the basic system cabinet, he added.

Price is dependent on memory capacity, but is said to be less than the core memory replaced.

AMS headquarters is located at 1276 Hammerwood Ave., 94086.

Resembles Standard Copier

Xerox Printer Accepts Tape, CPU Input

By Michael Weinstein
Of the CW Staff

NEW YORK, N.Y. — Xerox has combined its off-line computer efforts into a single non-impact, "xerographic" computer printing system.

The 1200 resembles the standard Xerox copier on the printing operation and is available in two versions. An off-line model prints from industry-compatible magnetic tapes, while an on-line model operates as a peripheral to the Xerox Sigma 6, Sigma 7 or Sigma 9 computer systems.

The 1200 uses the same kind of paper as the firm's copiers — unsensitized 8-1/2 in. by 11 in. paper — and prints at speeds up to 4,000 line/min.

This corresponds to a throughput of over one page/sec, according to a Xerox spokesman, which is about twice as fast

as a standard impact-type printer, he added.

An additional feature of the 1200 is its



Xerox 1200 printing system produces copies of computer-generated information on unsensitized 8-1/2 in. by 11 in. paper.

ability to use preprinted paper stock so that fixed-format information can be copied simultaneously with variable tape or computer-generated data.

By using the off-line operation, users can print an unlimited number of copies, the spokesman said, eliminating the need for multiple passes on the computer. This contrasts with standard impact printers which are limited to a maximum of an original and five carbon copies, he added.

Modified ASCII Set

The 1200 uses a modified ASCII character set of 95 upper- and lower-case characters.

The off-line unit will accept data from any 800- or 1,600 bit/in., 9-track magnetic tape that conforms to either ANSI, IBM OS/360 or DOS/360, or Xerox tape formats.

The on-line version operates as a standard Xerox Sigma computer peripheral under control of the Xerox Control Program-Four (CP-4) virtual memory operating system.

Initial deliveries of the off-line model are scheduled for the fourth quarter of 1973. The computer-driven version is scheduled for delivery in the first quarter of 1974.

The stand-alone model, including magnetic tape input unit, leases for a minimum of \$2,600/mo. The computer-driven system leases for a minimum of \$2,100/mo.

Decision Data Has 5-Year Purchase Plan For S/3 Peripherals

HORSHAM, Pa. — A deferred payment purchase plan permits IBM System/3 users to buy data preparation equipment at about the same amount of money as it would cost to rent the equipment for five years, according to Decision Data Computer Corp.

Under the new plan, System/3 users pay an initial down payment with the balance of the purchase price paid in monthly installments over the five year period. For existing lease contracts, up to 70% of the monthly rental may be credited against purchase price.

The purchase monthly payments, which include maintenance costs, are lower than the monthly charges under either of the firm's present rental programs, a spokesman said.

After the five-year period, the only user costs are those for monthly maintenance.

Card equipment covered in this offering are the Data Recorder, Interpreting Data Recorder, Alphanumeric Sorter and Sorter/Print Recorder.

Decision Data is located at 100 Witmer Road, 19044.

uniscope 100: now interfaced with all centronics printers!

CENTRONICS

A prize in every package.

And what a prize. Diablo's new Type 1000 is now the best dot matrix printer in the market. It's an improved relative of the Type 1000, but with added features, with a speed of 1000 characters per second. That's two to five times faster than the previous H-Type print quality, matching the best dot matrix printer in the market. And you get free software for each type of computer, standard carbon forms. A unique easy-to-change 960 character wheel cartridge, an optional fast switch feature

and a variety of type styles (including 1000 characters). A cartridge with a high capacity cartridge estimated to last up to 100,000 characters. Our Type 1000 has already been shipped, and during this time, the free performance evaluation lets you expect from Diablo products. The Type 1000 is truly a prize among printers. For more information, write or call Diablo Systems, Inc., 24500 Industrial Boulevard, Hayward, Calif. 94545, 415 783-3910.

Diablo

Systems, Inc.
A Xerox Company



Here's good news for DOS 360/370 users!

GRASP - the other half of your operating system.



GRASP is the most effective DOS systems software available today. It's providing dramatic dollar savings to over a thousand installations around the world. Here are some of the reasons why.

WRAPAROUND SPOOLING: Faster than IBM spooling and much easier to install and operate. Requires much less core and disk space.

COMPLETE JOB ACCOUNTING: Consumes about one percent of CPU time for accounting. IBM's uses about ten percent. Statistics collected are far more meaningful and comprehensive.

SELF-RELOCATABILITY: One copy of all programs means reduced maintenance costs, reduced disk requirements

for libraries. Speeds execution of overlaid programs—like SORT.

PARTITION BALANCING: A completely transparent priority dispatcher that increases throughput 8 to 12 percent per partition.

FOURTH PARTITION: Adds a complete, storage protected partition for GRASP's residence. IBM spooling takes one of DOS' partitions.

AUTOMATIC VOLUME RECOGNITION: More usability for tapes and disk. More fluid multi-programming.

RESIDENT TRANSIENTS: Especially for the ISAM user, phenomenal reductions in run times.

PCI FETCH—CATALOGUED PROCEDURES—TAPE SPOOLING—are among many more time and dollar saving features of GRASP.

GRASP can be installed in just 15 minutes, with no change to existing programs or procedures. The savings start immediately.

GRASP is a product of Software Design, Inc., the performance leaders in DOS systems software, and supported by a worldwide organization of specialists whose only business is DOS systems software. Send for your GRASP button today, and the other half of your operating system.

DOMESTIC

Atlanta Los Angeles
Boston Minneapolis
Chicago New Jersey
Cleveland Philadelphia
Dallas Pittsburgh
Detroit San Francisco
Kansas City Washington, D.C.

INTERNATIONAL

Geneva
London
Melbourne
Milan

SDI
Software Design, Inc.
880 Mitten Road
Burlingame, California 94010

Software Design, Inc.
880 Mitten Road, Dept. B
Burlingame, Calif. 94010

Please have an SDI representative show me how the GRASP button will give me the other half of my operating system.

Name_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

Telephone_____

We have 360/370 Model_____

Word Recognition System

PITTSSTON, Pa. — Quality inspectors at Owens-Illinois Corp. are using a Voice Data Encoding System (VDES) to data entry of quality control measurements. As each inspector measures each component he speaks his findings into a headset microphone. From this vocal input a monitor displays the input data so the inspector can verify it or see if the measurement is out of tolerance.

If the displayed data is correct — i.e., exactly as he voiced it — he uses the control word, "go," which directs the system to input that data to a central processor.

If the information is incorrect, he speaks a control word and his measurement. The retry is overlaid in the buffer area with the never voice input figures displayed on the screen of the visual display unit.

He speaks a VDES developed Threshold Technology Inc. is a word recognition system that analyzes and compares words as they are entered by comparing them with referenced samples stored in the system.

System Trained

Samples are introduced during a training period, in which each inspector who will be using the system repeats each command in the system's vocabulary ten times.

When a production floor inspection entry is later made by that particular inspector, the stored reference sample most closely matching the incoming command is selected as the proper response and is visually displayed on the front panel as numerical output.

Mark II Controller Protects Systems During Power Loss

SAUGERTIES, N.Y. — FX Systems Corp. has introduced a programmable controller system, called the Mark II, Un-Computer, Series 700.

The unit is designed to protect against failure of other inputs, and a power-failure guard circuit insures completion of the step being performed despite loss of power, the firm said. Protective circuitry transfers control to a shut-down routine that preserves all program and operating data, halts processing and returns to a logical point in the control cycle for restart when normal processing is possible.

SCI-10 Language

The programming language used is called SCI-10 and it employs English-language instructions. Logic is programmed and entered through a teletypewriter.

The basic controller costs \$2,950, including rack and front panel, wiring to accept six optional I/O interface cards and priority interrupt with arithmetic logic. The power supply is an option at an additional \$400. Delivery is three months from Mount Marion Road, 12477.

Test Station Provides On-Line Diagnostics

ANN ARBOR, Mich. — An expanded test station is now available at Syntex Inc. headquarters to provide the firm's field engineering representatives on-line answers to user's hardware communications problems.

The custom-designed test station uses a digital switching device to duplicate network terminals, and is capable of operating in Asynch, Echop, Half-Hop and binary synchronous modes from 1,200 to 2,400 bit/sec. Asynchronous transmission is from 37.5- to 1,200 bit/sec.

After a voice verification that the displayed data is correct, the computerized data is retained along with descriptive information such as the measurement category associated with the voice input.

This information when combined with the inspectors audio measurement data describes any one piece being inspected. Later the same input forms the basis of a report or can cause an alarm to sound if a piece is out of acceptable tolerance range. In a typical operation a standard teletypewriter provides the hand-held control for the inspectors. The TTY's standard functions are to provide manual control, entry of heading information, a final report and corresponding paper tape containing inspection data.

Day in the Life

In a typical day of operation at Owens-Illinois the quality inspector comes on duty and goes to the teletypewriter —

perhaps located in a separate room with supplies and accessory equipment.

He begins by directing the system to accept a sample program for use with a given type of equipment — in this case television tubes.

A run of up to 11 samples is begun by entering on the TTY keyboard the heading containing item code data, shift, name of inspector, name of the foreman, plunger, survey number and shift.

The system is now ready to accept spoken data from the inspector with a maximum of five digits and positive or negative sign entered for each measurement.

As each entry is made, it is compared to any applicable tolerance limit previously stored. If a measurement is "out of tolerance" a lamp is lit on the display and the operator types in the width, sample number and data category. This allows the operator to check the measurement.



Inspector measures the width of a television tube, entering the result through his headset.

ment value and/or take any corrective action required.

Threshold Technology is located at Route 130 and Union Landing Road, Cinnaminson, N.J. 08077.



ITT Asciscope Display

The complete CRT terminal. All this for only \$65.00 a month...

- Built-in modem
- Built-in acoustic coupler
- Terminal-to-computer and terminal-to-terminal communications
- Teletype compatibility
- Buffered display
- Interfaces for printers, higher speed modems
- Nationwide ITT service

They're all standard ASCISCOPE display features. Result: you're on line immediately with ASCISCOPE.

There's no complicated installation or reprogramming required. And with our Service by Immediate Replacement—SIR— we won't leave you waiting. If you need ASCISCOPE—we'll replace it on the spot from one of ITT's 62 nationwide service centers.

If you're ready to replace noisy, slow, primitive terminals with state-of-the-art ASCISCOPEs, call Jerry Porter at (201) 935-3900. Or write ITT Data Equipment and Systems Division, Dept. 401, International Telephone and Telegraph Corporation, East Union Avenue, East Rutherford, N.J. 07073.

International Telephone and Telegraph Corporation
East Union Avenue, East Rutherford, N.J. 07073

Rush brochure on new Asciscope.

| | |
|----------|--|
| Name | |
| Title | |
| Company | |
| Division | |
| Street | |
| City | |
| State | |
| Zip | |



DATA EQUIPMENT and SYSTEMS DIVISION

THE REASONS TO KEEP YOUR IBM 1130:

THE REASONS NOT TO:

Throughput. You already know there's a limit to the throughput your 1130 can handle. If you haven't reached that limit yet, you probably will. Then come the problems. You don't want to move up to a more expensive system. You don't want to rewrite your software. You don't want a lot of grief. We think you should check into our "Super" 18/30 DMS. It's a direct 1130 replacement that gives you three to ten times the throughput at about the same cost. And it still uses all your existing programs.

Real Time. Your 1130 doesn't have real time capability. Our 18/30 does. It's a fourth generation computer with real time, multi-programming (on-line CRT, etc.) capability. And we're prepared to help you make the conversion to real time, now or any time you are ready.

Money. The 18/30 does much more work for almost exactly the same number of dollars. And lets you avoid having to move up to a bigger, more expensive computer with all new software to write. The result: enormous savings in dollars, downtime and anguish.

None of the above. Even if you aren't throughput-bound and couldn't care less about real time at the moment, we can still help you cut costs. Our "Mini" DMS also works with your 1130 software and gives you at least the same throughput (much more in disk work). All for as much as 40% less per month than you're paying now.

Us. Anybody who says they can do all this is worth talking to. Call Ron Doiron at (714) 778-4800. Or write him in care of General Automation, Inc., 1055 S. East St., Anaheim, Calif. 92805.

**GENERAL
AUTOMATION
18/30 DMS**

See DMS in Booth 2201 at the National Computer Conference.

OEM Products

While equipment in this column is primarily for OEMs, Equipment Manufacturers, and Distributors, it is also available in single units to interested users. Further, while some of this equipment is designed specifically for the OEM and user, it does give some indication of the features and performance when incorporated into end-user equipment.

Floppy Disk Memory System Designed With Fixed Heads

BOULDER, Colo. — A "floppy" disk memory system designed with fixed heads that fly above the floppy disk surface is available from Intelligent Memory Systems Inc.

The MU/104 series is available in three models: the MU/104 — cartridge only; the MU/108 — cartridge plus 16 Kbytes on the fixed disk; and the MU/112 — cartridge plus 32 Kbytes on the fixed disk.

All models are designed for 130 bytes/sector, have an average access time of 16.7 msec, and an data transfer rate of 1.06 Mbytes/sec.

Prices without interfacing range from \$760 single unit price to about \$500 in OEM quantities for the MU/104 from 5721 Arapahoe Ave., 80303.

Build Your Own Mini

NATICK, Mass. — A build-it-yourself minicomputer system is available from Control Logic, Inc.

A minimum LSI/MOS based system sells for under \$400 and consists of an 8-bit processor, I/O control and memory address buffer.

Other L Series modules include a 512 by 8-bit Prom, 256 by 8-bit RAM, Universal Asynchronous Receiver/Transmitter.

Prices of modules range from \$30 to \$325 from Nine Tech Circle, 01760.

Tape System for Digital Use

HIGHLAND PARK, Ill. — Data Specialties has announced a tape perforator system designed for applications such as recording the output of digital instruments.

The PER-820 operates at 20 char/sec asynchronously. The unit accepts logic level input signals.

Cost is \$1,050 from 1548 Old Skokie Road, 60025.

Sweep Generator Uses LED

SAN DIEGO — Wavetek is offering a sweep generator with a front-panel LED digital display that shows the frequency and positive/negative peak voltages of the output signal with 3-digit resolution, a spokesman said.

The Model 147 is a 0.005 Hz to 10 MHz source of sine, triangle, square, positive pulse and negative pulse waveforms with variable amplitude, dc offset and symmetry, the spokesman said.

Price of the 147 is \$1,295 from P.O. Box 651, 92112.

ROM DTL/TTL-Compatible

SUNNYVALE, Calif. — Monolithic Memories Inc. has announced cod. No. MM5280/6280 ROM with 8K-bit storage.

Access time for the 8K ROM is 150 nsec maximum, with power dissipation of 50 μ W/bit. It is DTL/TTL-compatible with 1/10 of standard TTL input load and open collector output.

The price of the MM5280 is \$55 in lots of 100 from 1165 E. Argus Ave., 94066.

Raster Graphic System Displays Black/White And Color Images

SUNNYVALE, Calif. — Ramtek Corp. has introduced a solid state, raster graphic system with capabilities for color, grey scale or black and white.

Capabilities of the GX-1000 include alphanumeric generation, graphic plotting, artesian graphics, selectable erase and reverse background. These capabilities are furnished within the system controller resulting in reduced software requirements and reduced computer time requirements, a spokesman said.

Resolutions are 256 elements by 256 lines and 512 elements by 256 lines. All points are addressable and 26 applications



Screen displays output provided by the GX-1000.

combinations are possible, he added.

The system is priced — in OEM quantities — at \$1,500 per channel for grey scale or color, and about \$1,500 per channel for black and white graphics from 292 Commercial St., 94086.

Cassette Recorder Has Variable Speeds

PASADENA, Calif. — A digital cassette tape recorder for use in data gathering and processing systems has been announced by Bell & Howell's Electronics & Instruments Group.

Available in single and dual-track models, the recorder uses standard Philips-type cassettes with digital grade tape. Any operating speed between 2 and 20 in./sec. may be selected.

The unit operates in incremental or continuous modes, and in several combinations of recording codes and data channel selections.

The recorder sells for \$360 in OEM quantities of 51 to 100 from 360 Sierra Madre Villa Ave., 91109.



3. COPE 65
Communications Controller

1. COPE 4705 Communications Controller
Designed to provide 380-370 users an alternate for IBM 2701, 2702, 2703 and 3705 transmission control units... at reduced cost. Our "Emulation Plus" Program supports both asynchronous and synchronous terminals at line speeds up to 2600 bps.

2. COPE 1200 Series
COPE remote batch terminals are the most economical, flexible and cost-effective means of accessing major large-scale computers (including the IBM 360/370 Line), using ordinary voice-grade lines, coaxial cable or Telnet lines for maximum economy.

3. COPE 65 Communications Controller
COPE 65's can simultaneously interface with up to three IBM 360/370's, CCC 6000's, VME 1000 or 1000/2000's and under their normal operating systems. Various bi-synch, 1004 and 200 UT protocols can be accommodated at speeds from 200 to 50 KB.

4. COPE 1000 Series
COPE portable conversational keyboard terminals are designed to fit IBM 2740 and 2741 and operate at speeds up to 15 cps for both on- and off-line applications.

1. COPE 4705
Communications Controller

Larger Memories Coming

Trial Papers Imply IBM Withholds 135 Enhancements

By E. Drake Lundell Jr.

Or the CW staff

TULSA, Okla. — The first announcement of the 370/135 "did not include many key elements of the total system package," secret IBM documents revealed here in the Telex antitrust suit against IBM.

"These follow-on items were left for later announcements either for strategic purposes or lack of currently available resources," according to the Model 135 "Greybook," a financial analysis of the expected product

performance.

Under the memory upgrade plan users will be able to upgrade their memory on the 135 from the present 240K maximum to either 368K or 496K, according to the documents. But the memory upgrade is just part of an entire package of enhancements planned for the 135 this year, according to the IBM papers.

Several of the enhancements, it noted, were dependent on groups outside the Data Process-

ing Division, most notably the Components Division, which was then developing a memory known to IBM as "FET-CP" to be used in later versions of the 135.

This memory, the document said, was intended to be four times as dense as the memory announced with the 135 and would offer "two distinct advantages" when used with the 135.

First, the Greybook said, "Its density would enable considerably more than 240K of

memory to fit under the covers of the CPU". Since it was IBM's intention to provide more memory for the 135 than the original maximum of 240K, it was important to have the extra memory, the document said. It would be less vulnerable to replacement than there in a separate box, as would have been required if the firm had used the original 135 memory to upgrade the capacity.

The second reason the development of this new memory was important to IBM was "its low

cost would provide" between \$30 million and \$40 million in cost savings, since the firm planned to use the new memory in all 135s after December 1973.

Additional Enhancements

In addition, there will also be an integrated file adapter (native attachment) for the Winchester-type disk units, a scientific acoustics terminal and a real-time channel/priority interrupt feature for the system.

All these features are expected to be available for first customer deliveries by the end of this year unless the IBM development plan slips, according to the documents. Apparently the announcement plans have already slipped since they were due late last year.

One project that has already been canceled by IBM was to be a new operating system for the 135s and 145s known internally as Leo. This project has been shelved, apparently permanently, but no reasons were given.

Surprisingly, although the 135 Greybook devotes a great deal of time explaining the advantages of AOS-1, which became VS-1 for the 135 users, the IBM projections show that they do not really expect many users to go to it for their operating system — even if it is used as the major sales tool for the system.

The peak year for the use of VS-1 among the 135 users is seen to be 1976, when 12% of the users will be using it. However, at that time, it expects most of the users (87%) to be using DOSE (DOS extensions). At present most users, according to the projections, should be shifting from straight DOS to the DOSE package.

The major problem of the 135 was to provide a migration path for the 360/35 and 30/30, according to the document. It noted that 360/25 users should be willing to pay the 24% to 43% increase in price to get the additional features and higher speeds, while the typical 360/30 users were expected to pay between 15% and 29% more to make the upgrade.

"Such increases should not be difficult to sell unless the customer is strictly price conscious and has no requirements for throughput performance," the Greybook asserted.

The IBM planners were worried when the 135 was announced that the other mainframe makers might come up with new systems that would compete heavily against the 135.

But a few months later they could confidently say, "Most of the anticipated competitive announcements did not turn out to be as dramatic as expected."

Indeed, the planners noted the RCA 2000 came closest to the 135 on a performance comparison. "However, it was not as price-competitive as had been expected."

Overall the IBM planners could note the 135 should be a "marketing and financial success" for IBM. "It had been indicated that over its pricing life of 48 months the system should return a profit of \$1.6 billion on revenues of \$5.5 billion worldwide, or around 30%."

Two great names are better than three great letters.

COPE®/HARRIS

COPE and HARRIS. A great marriage. Combining one of the oldest, best known names in remote site communications with one of the giants in electronic and printed communications. The emerging company — Harris Communication Systems Inc., a service company.

Way back when remote terminals were mainly all talk, COPE was already making history, bringing the power of a supercomputer to your door with unprecedented economy. COPEs provided the fastest speeds, best cost/throughput ratio, broadcast line in the industry. Even more significant, COPE pioneered the COPE mode, a "textbook" full duplex transmission mode that other terminal manufacturers still don't offer. And COPEs at the front-end lifted the communications load from your big systems... freeing them to do what they do best — compute.

Now with solid backing by HARRIS, COPEs can give you even more. More system flexibility, unexcelled throughput and efficiency and trouble-free service. After all, COPEs are backed by total hardware and software support services and maintenance through our own field engineering organization. We support

over 3,000 of our data terminal installations in the United States, Canada and Europe. And when you specify COPE you get a complete hardware/software/maintenance package. Plus convenient leasing plans, too.

So it's important to know that now, when you go for COPE terminals, controllers or peripherals, you'll be getting all the advantages two great names can offer.

And better performance, at less cost, than You. Know. Who.

Find out more by completing the coupon on this page and mailing it to us. Or call our product marketing manager at (214) 241-0551.

TO: Harris Communication Systems, Inc.
11262 Indian Trail/P.O. Box 44076
Dallas, Texas 75234

Please send more information on the following products:

COPE 1705 COPE 1000 Series
 COPE 1200 Series Please Have a
 COPE 65 Salesman Contact Me

Name _____
Company _____ Telephone _____
Street _____
City _____ State _____ Zip _____

HARRIS
COMMUNICATION SYSTEMS, INC.

a subsidiary of Harris-Intertype Corporation
11262 Indian Trail / P.O. Box 44076 / Dallas, Texas 75234

Canada: 1400 Don Mills Road / Don Mills, Ontario (416) 449-8571

Bon



appétit

Large, Hippo-like computers are gluttons for data. But even wallowing in rivers of watered down data isn't the answer. Your computer needs a gourmet diet of high quality data — great mouthfuls at a time.

Inforex Data Entry Systems give you both quantity *and* quality.

For example, concurrent data entry and verification improves throughput. Full record display simplifies error detection and correction. System-generated messages assist operators. Processor logic and checks make sure only the choicest data gets to your computer.

Plus a full range of data entry functions: Virtual Program Control, Key-stroke Counting, Automatic Batch Transfer, Keystation Command Mode...and more. In addition, only Inforex Systems let you do file searching and update in place on both disc and tape.

You can get more than just data entry, too. Line and Serial Printing, fully formatted, On- and Off-Line Communications for local or remote locations, and advanced 1600 BPI Phase Encoded tape output for high performance tape transports.

No wonder Inforex has more key-to-disc systems installed than anyone else in the world.

Oui.

Choose system 1301, 1302, 1303 or In-Line Data Entry for the price/performance/backup mix that best meets your needs.

Inforex. The high performance feed company for your computers. Offices in major cities throughout the United States, Canada and Europe. Distributors world wide. Talk to us. Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803.



 INFOREX

Talk to us at NCC Booth 2537

Called Expensive 'Prima Donnas'

By Joseph Hanlon
Special to Computerworld
NOTTINGHAM, England—User programmers have no future—their jobs are disappearing and their promotion prospects are almost nil. Within a few years, the remaining user programmers will have jobs comparable to that of a bank clerk, with most of the traditional responsibilities split between operators and systems analysts.

These conclusions were drawn from three papers given at the Datafair conference here last month.

Datafair is the biennial conference of the British Computer Society. Attendance was estimated at 5,000, down more than 2,000 from 1971 figures.

Carrie Davies, a former computing positions to general management is a myth—programmers may become DP managers, but they won't move into general management, IBM consultant systems

engineer Brian R. Edwards told the Datafair attendees.

Three arguments were cited as necessary for career progression: the high IQ of the

There are really only two ways for a Dper to have career prospects: "Take the risk of leaving computing and breaking into one of the main line areas, such as marketing or production, or move to an organization which is dedicated to computing."

computer community, its widespread knowledge of the organization and its power. Edwards then explained why none of these factors really work. IQ, controlled through programmer aptitude tests, has no correlation with management ability, he said.

DP managers tend to be concerned with "improving mechanistic aspects of a department's work," and to look to the internal system rather than to customers, suppliers, etc. Line managers, on the other hand, "are primarily concerned with the non-mechanistic aspects" and must look outside. So the DP manager largely has training in the "wrong part of the business."

As for power, Edwards stated, "The DP manager is vital as a provider of a service, but he is nowhere near insuring the functions of those whom he serves." He is powerful only in the negative sense that he can stop the organization.

Management information systems may ease the problems, but only if the DP manager dedicates himself to building a system to actually serve the chief executive, Edwards suggested. The DP manager then enhances the significance, value and power of his job.

"The best advice to the ambitious computer man who seeks to exercise 'general management' is to do so below the DP function in his organization, that is, it becomes the DP manager of the chief executive's control system," Edwards said. Failure to do this may indicate a lack of ability for general management positions. But this route seems open to very few DP managers. Edwards cited one study that showed "fewer DP managers of nearly all the companies were people with significant experience prior to DP, or people with assignments in companies where DP is the business."

This means, he explained, that there really are only two ways for a Dper to have career prospects: "Take the risk of leaving computing and breaking into one of the main line areas, such as marketing or production, or move to an organization which is dedicated to computing."

Job Disappearing

This advice is good for another reason—the job of the user programmer is disappearing, but its passing should be encouraged, according to David Willingham, senior consultant for Management Data Services, London.

"The user programmer is being reduced to the level of a coder and program tester," Willingham asserted. This has happened because "part of his job is being performed by the systems analyst who often descends to considerable depths of detail," largely because the introduction of modular programming makes that objective can be translated to software without "knowledge of detailed programming tricks."

Another part of the programmer's job has been taken over by the operator, who has risen "from a mere button pusher to somebody who is essential to the efficient running of the large, complex systems that we favor these days" and who is now "often responsible" for library maintenance, reprogramming and recognition of bugs.

Program generators and software packages have also reduced the need for programmers, aided by the increasing compatibility both of ranges and of different manufacturers' machines, Willingham declared.

In a few years, virtually all remaining programmers will be with software houses and manufacturers. And DP managers are sure to encourage this trend, he argued, because programmers are "expensive 'prima donnas' who only 'created additional problems.'"

Middle-Aged Programmers?

And what of the programmers who remain? "One never raises an eyebrow at the middle-aged programmer with a civil service image, but the concept of a middle-aged programmer was laughable."

No more, according to Rosemary Sarsfian, manager of Computer Personnel International. Programmers now must expect to do "the same job month after month just as white collar workers do, enjoying a professional status with few promotional rewards."

Sarsfian, in essence, supported Willingham's view of the programmer's future: "a programmer will gradually have less and less responsibility" and the job will be comparable to that of a bank clerk.

Car Pools Catching On

PASADENA, Calif.—A two-year-old car pool program at Burroughs Corp. facilities here has cut parking space needs by 30%, the firm said. Since parking space shortages plague many employers to promote car pools, Burroughs is making its car pool computer program available to interested employers through "Operation Oxygen," an environmental organization.

SMART 360 LOGIC CORE

Send information on the compatible Core Memory that will provide more capacity in less space, at greater savings for my 360 model 22, 30, 40, 50, 65, 65 mp, 67 or 75. See us at Booth 2407, National Computer Conference.

| | | | | | |
|---------------|-------|------------------|-------|--------|-------|
| Name | _____ | | | | |
| Company | _____ | | | | |
| Address | _____ | | | | |
| City | _____ | State | _____ | Zip | _____ |
| Phone | _____ | | | | |
| 360 Model | _____ | Date core needed | _____ | | |
| Capacity from | _____ | to | _____ | kbytes | _____ |

STANDARD MEMORIES

INCORPORATED
A Subsidiary of Applied Magnetics Corp.

2601 E. Oakland Park Blvd., Suite 307 • Ft. Lauderdale, Florida 33306 • Tel.: 305-566-7611
TWX 510-985-9878

Market Advice Compiled**Data Bank Aids Home Builders, Sellers**

By Patrick G. Ward
Of the CW Staff

ANAHEIM, Calif. — For the past three years, Walker & Lee, a sales organization, has been putting data on every home it has sold, (some 10,000 a year) into a data bank to aid the firm's salesmen and developers.

Commuters Match Up

ANDOVER, Mass. — Two commuters have planned a computerized carpool system for traveling into and out of Boston every day.

The basis of Commuter-Match is a list of commuters' names in specific locations, matched by computer, which is supplied to a member for a small initial fee, the planners said.

Armed with the list, the buyer can make his own traveling arrangements.

Data on the home buyer includes income, profession, family size, age and former residence specifications. Data on the homes the firm sells includes specific information on the number of bedrooms and baths.

Each member of the sales force is coded along with his individual sales to indicate what kind of buyer he functions most effectively with.

To aid developers, George Fulton, director of research and development for the firm, says: "We look at the demographics of the population segment in question — study the information available from the census department, review population projections, building permit trends and occupancy rates — to determine supply versus demand, both current and potential.

"We can then tell the developer

what type of homes in what price range is most suited to his market, and, if we are going to handle the sales for the project, who in our sales force will function most effectively in that market."

"There are other ways we can use the data," Fulton said. "If we see a large number of \$24,000 to \$28,000 homes on the market, we can ask the computer what kind of homes these sellers are likely to buy."

"And if we see a high occupancy rate on a given rental bus, we ask the computer what kind of a house does that renter typically buy."

DP on TV

AMSTERDAM — It's DP on TV in The Netherlands. About 3,000 Dutch students have paid a \$46 fee to enroll in a 36-lesson television course in basic computer science that began last September.

One thousand students plan to take an exam supervised by the Dutch Government in addition to their regular course work.

To prepare for the exam, the students meet on eight Saturdays when 30 teachers instruct them.

The students regularly do their homework assignments, a Dutch spokesman reported. Each student puts down his answers to 100 multiple-choice computer questions on mark-sensing cards. A computer checks the answers, computes each student's average and a class average.

Is equipment service squeezing your profit?

RCA Service Company can supply complete maintenance, emergency and metallurgical service contracts for electronic or electro-mechanical industries. We're specialists in communications, control and data processing equipment, and we're a single user, and account of the manufacturer.

• Stop the profit squeeze.
• Complete price and benefits.
• Simplify your maintenance.
• Decrease down-times.
• Lower overall service costs.

Write or phone for details:
S. L. Gosselin, 200-204-2
RCA Service Company
A Division of RCA
Somerville, New Jersey 08810
Phone: (800) 739-4129

RCA

One of the best things about the Bell System's Dataphone 4800 data set is the maintenance behind it.

This new solid state data set transmits at 4800 b.p.s. over basic, unconditioned, private-line facilities.

It has a 50 millisecond turnaround time that makes it suitable for multi-point or point-to-point systems.

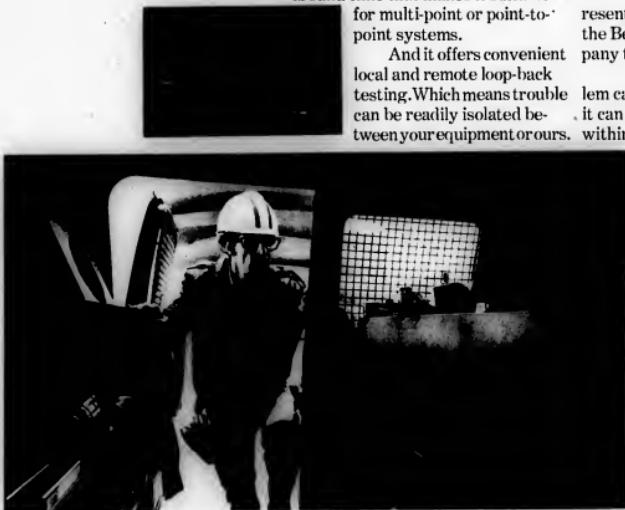
And it offers convenient local and remote loop-back testing. Which means trouble can be readily isolated between your equipment or ours.

Perhaps even more important, the Bell System has what is called the Data Technical Support Team.

This team is made up of representatives from various levels of the Bell System, from the local company to Bell Labs.

When necessary a data problem can be taken to the level where it can be solved quickly. Usually within hours.

At AT&T and your local Bell Company, we know how costly "downtime" can be to your business. You don't have to say another word.



We hear you.



DEPEND

ON THE
INDEPENDENT THAT OFFERS
ALL THE MAJOR PERIPHERALS.

6420/6803
MAGNETIC TAPE
SUBSYSTEM

6250 BPI

6360
MEMORY
SUBSYSTEM

5314 DISK STORAGE
SUBSYSTEM

5848
OFF LINE
PRINTER SUBSYSTEM

6410/6411
TAPE STORAGE
SUBSYSTEM

6330
DISK STORAGE
SUBSYSTEM

TELEX offers the broadest range of peripherals, the most advanced technology and significant cost savings.

All major peripherals plus complete functional compatibility with IBM System 370 or 360. TELEX tape, disk, printer and memory subsystems require no special adaptation to be combined with IBM central processing units. And, you'll find you not only get functional compatibility, but you get advanced circuitry to lengthen component life, minimize service and maximize availability.

TELEX subsystems offer improved performance and greater flexibility than comparable IBM subsystems. This gives you the opportunity to develop system configurations that are more closely aligned with your individual requirements. As specific examples of performance improvements available with TELEX peripherals, consider these: 1) The TELEX 6330 disk storage subsystem has access times ranging from 10% to 30% faster than the 3330. 2) TELEX printer subsystems average 10% faster printing than the 1403 N1 and have exclusive on-line, off-line or concurrent on-line/off-line capability. 3) The TELEX 6420/6803 magnetic tape subsystem offers two data rates not available with the 3420/3803 subsystem at 800 or 1600 BPI.

TELEX subsystems offer self-contained micro-programmed diagnostics. This means

that potential and actual failures can be quickly and accurately isolated and the information necessary to correct errors is provided so that interruption is minimized. With our 6360 memory subsystem, for example—when multiple basic storage modules are employed—an error condition can be diagnosed off-line in one unit while the remainder of the memory is still available to the user.

TELEX offers superior field service. We have the largest, most experienced network of highly trained—TELEX trained—service personnel in the peripheral industry. This means better assistance to you in preventive maintenance, in minimizing system downtime, and maximizing system availability to you.

TELEX combines advanced technology with substantially reduced pricing. Regardless of which TELEX peripheral subsystems you employ, or whether you lease or purchase, you'll find substantial savings over comparable IBM prices. Lower rental and purchase prices, coupled with the TELEX unlimited-use plan, result in dramatic overall dollar savings. And while we're talking about costs, be sure to look into the TELEX total system lease plan that includes your choice of IBM main frame and all the required major peripherals.

Simplify your purchase, lease and service agreements by depending on a single company for all your major peripheral needs. Get the complete story from your TELEX representative.

where the difference begins
TELEX.

Preferred
the PERIPHERAL COMPANY
TELEX COMPUTER PRODUCTS, INC.
6422 East 41st Street • Tulsa, Oklahoma 74135 • (918) 627-1111
TELEX, LTD.
101 Duncan Mill • Don Mills, Ontario, Canada • (416) 445-8050
TELEX EUROPEAN GROUP
213 Oxford Street • London W1P 4AH, England • 01 734-9131
Paris • Frankfurt • Zurich

Ask your TELEX representative about the TELEX total system lease plan.



Secret Documents Reveal

IBM's Pollution Control Efforts Cut Back

TULSA, Okla. — IBM had cut back so deeply to increase profits in 1970 and 1971 that some of its efforts in the pollution control field — a pet project of top management — had been eliminated or slowed down.

Secret documents from the Telex suit against IBM revealed the deficiencies were so serious, the top IBM management committee, the Management Review Committee, was told in March of 1972 that IBM had in fact been in violation of some state and local regulations in the U.S.

However, on learning of the violations, the Management Review Committee reinforced the IBM commitment to a "pollution-free environment" and told the various parts of the company to expend the necessary resources to meet these goals.

At that meeting, the MRC received a report that indicated "IBM was now operating on a minimum program to meet state, local and federal government requirements. As a result of being so close to the line, we have had intermittent violations."

The minutes add: "The committee expressed some surprise at our lack of leadership in this area in light of their previous understanding that we were totally pollution-free." The committee was told of some of the basic in compliance with existing regulations, and the current issue was thought to be one of how to move beyond our current position on a prioritized basis."

The Committee also demanded the people involved for their failure to bring the matter to its attention and "in light of

the attendant delay, it was deemed more important than ever to move quickly toward attainment of the previously stated goals."

Overall the firm plans to spend \$52.5 million during the 1972 to 1976 time period in order to meet its goal of a totally pollution-free manufacturing environment by 1976. Of that figure \$7.1 million was slated to be expended in 1972 and \$23.5 million this year.

The committee asked the people involved in the effort if it could be speeded up by the expenditure of more funds earlier in the program, but the firm was assured that the firm was moving as fast as possible under the revised plan re-emphasizing the commitment to the idea of a pollution-free environment.

MIS Gives Firemen Relief

NEW YORK — A multimillion-dollar computerized management information and control system will provide extensive information for the New York City firemen.

The system will be required to keep constant track of all equipment so fire companies can be moved into unprotected areas if the home company is out for a long time. The system will also inform the personnel department when a fireman should be rotated out of a busy house because of age or other handicaps, and will provide injury reports.

The system will also keep inventory on apparatus and parts.

We talk terms

When you're in the market for 360/370 add-on memory, you're not just looking for a piece of equipment. You're looking for the solution to a problem. That solution has to make as much sense in terms of cost, lease commitment, and site support as it does in equipment performance. That's why we tailor our terms to meet your needs.

Why EMM? Let's start with experience. EMM is one of the world's largest independ-

ent memory manufacturers. Most of the mainframe computer companies use our memory systems or components.

Our technology goes right down to basics. We manufacture our own cores. Design and build our own stacks and system modules. Add the electronics for the total memory. And give them all the same degree of manufacturing control that put us on the Apollo program. EMM is the only independent memory company to receive IBM approval for 360/65 CPU maintenance when add-on

memory over 1 megabyte is installed.

We have the stability of a major company committed to the memory market. We'll be around tomorrow and a lot more tomorrow to come.

But the main reason for our success has been satisfied customers. Satisfied with terms as well as performance.

If you're interested in 360 or 370 compatible memory, call Dick Bravo at (213) 644-9881, or contact our nearest office.

We'll talk terms.

EMM COMPUTER PRODUCTS
A Division of Electronic Memories & Magnetics Corporation

12621 Cherdon Avenue, Hawthorne, Ca 90250

There's an EMM office near you.

LOS ANGELES 10650 Wilshire Blvd.
California Suite 320
(213) 477-3911

SANTA CLARA 1333 Lawrence Expressway
California Suite 264
(408) 247-9711

DES PLAINES 1400 East Touhy Avenue
Illinois (312) 287-3110
(600) 287-3110

WELLESLEY #4 Wallasey Office Park
Massachusetts 40 William Street
(617) 437-4600
(216) 437-4600

SOUTHERN CALIFORNIA 24411 Cherdon Center Drive
Michigan (313) 585-1046
(407) 585-1046

MINNEAPOLIS 7317 CalHill Road
Minnesota (612) 941-1643
(612) 941-1643

CLAYTON 130 South Bernstein
Missouri Suite 101
(314) 653-0015

SADDLE BROOK 200 Market Street
New Jersey (201) 845-0450
(201) 845-0450

CLEVELAND 8000 Pearl Road
Ohio (216) 864-1800
(4413) 864-1800

ABINGDON 947 Old York Road
Pennsylvania (215) 867-4940

PITTSBURGH 800 Seven Parkway Center
Pennsylvania (412) 921-1220
(412) 921-1220

MEMPHIS 3331 Fontaine Drive
Tennessee (901) 365-9180
(901) 365-9180

GALLAS 8888 Villa Creek
Texas Suite 285
(7524) 242-2374

HOUSTON 1200 South Post Oak
Texas Suite 104
(713) 626-3662
(713) 626-3662

ANNAPOLIS 7217 Little River Turnpike
Virginia (703) 841-2100
(703) 841-2100

SEATTLE 975 John Street
Washington Suite 208
(206) 622-1477
(206) 622-1477

INTERNATIONAL OFFICES
BRUSSELS Rue De Luxembourg #19
Belgium (02) 230-40-40
(02) 230-40-40
TWX: 846-22462

FELTHAM 92 The Centre
Middlesex TW12 8RZ
England TWX: 833187
TW 13 48H

PARIS 17 ame Rue Jouffroy
France 227-5619
TWX: 21 311



cira, disk & semiconductor memory technologies

EMM COMPUTER PRODUCTS

Canadian Conference Views Past, Future

EDMONTON, Alta. — The 1973 Canadian Computer Conference, to be held June 19-22, will concentrate on the theme "Focus 20/20."

As keynote speakers, C.C. Gottlieb will review the accomplishments of the last 20 years, and H.J. Von Baeyer will anticipate developments of the next 20 years.

Applications sessions include "ABC Using computers without programmers," a system which lets non-technical people use computers with the help of prewritten programs; V.W. Rankin of Stevens & Kellogg, Ltd.; "some underlying reasons for excessive computer systems implementation costs," by J.J. Lepak of IBM; "design considerations

for commercial RJE applications" by D. Hathaway, Placer Development Ltd., Vancouver; and "the Canadian computer network," which includes "the planning using simulation and queuing networks" by D. Selby and M. Alemparte, Department of Computer Science, University of British Columbia.

Software sessions include "controlling

Societies/ User Groups

and accounting of use on a multipurpose computing system" by W. Dietiker, Carlton University, Ottawa; "storage hier-

archy design concepts" by M.S. Doyle, University of Manitoba and J.W. Graham, University of Waterloo; "data management," by J. L. Lefebvre, manager of management, by M.W. O'Reilly and W.D.M. Sawyer of Bell Northern Research, Ottawa; and "small business systems" by M. Brode and D. Tsichritzis of the University of Toronto.

Workshop Series

Concurrent with the main technical sessions, a series of workshops include "features that may humanize or dehumanize an information system" chaired by Dr. Theodore D. Sternberg of Simon Fraser University; and "computer control and audit guidelines" chaired by R.J. Rosen of Fuller Jenks Associates, management consultants.

The conference is being sponsored by the Canadian Information Processing Society, which can be reached through P.O. Box 1881, Edmonton, Alberta T5J 2P3, Canada.

Simulator Conference Planned

GAITHERSBURG, Md. — The ACM-Sigsim/NBS Conference on Simulation of Computer Systems, to be held at the National Bureau of Standards June 19-20, will present a forum for state of the art information in the area of the application of simulation to computer systems' performance prediction.

Dr. Ruth M. Davis will present the welcoming address. The eight sessions of the conference include "languages for computer system modeling," "hardware and software monitors in support of simulation," and "model-driven modeling." Registration fee for the conference is \$35 for ACM, Sigsim or NBS staff members, and \$40 for others.

ACM Group Highlights

Personnel Research

COLLEGE PARK, Md. — Daniel Freedman of the State University of New York at Binghamton will be the keynote speaker at the Eleventh Annual Computer Personnel Research Conference, sponsored by the ACM Special Interest Group on Computer Personnel Research, to be held at the University of Maryland conference center June 21 and 22.

Seven sessions will cover topics such as "managing computer personnel," by professors Richard L. Nolan and Cyrus Gibson of Harvard University, "research needs for the next decade," by Robert N. Reinstedt of Rand Corp., and "careers for youth in computer occupations, 1971-1976," by Professor John L. Palmer of the Georgia Institute of Technology.

Friday morning will be devoted to workshops, and in the afternoon there will be panel discussions on the problems of certification.

Registration fees are \$55 for ACM members, \$65 for non-ACM members and \$10 for students.

Program chairman is A.W. Stalnaker, College of Industrial Management, Georgia Institute of Technology, Atlanta, Ga. 30332.

Call for Papers

RENO, Nev. — The National Council of Juvenile Court Judges is soliciting papers for presentation at its meeting in Atlanta Dec. 6-8.

The theme of the meeting will be the status and potential of computers in the juvenile justice system. Emphasis will be on both the theoretical and practical applications in research, administration, and decision making in courts and agencies working with juveniles.

Papers may address problems, solutions, research requirements, demonstration projects and other categories related to the theme of this symposium.

For additional information, contact: Lawrence A. Boxerman, Project Director, National Council of Juvenile Court Judges, Box 8000, University of Nevada, 89507.

Meeting Focuses On College DP

CLAREMONT, Calif. — The Fourth International Conference on Computers in the Undergraduate Curricula, co-sponsored by the National Science Foundation (NSF) and The Claremont Colleges, will be held at the Harvey Mudd College June 18-20.

The conference will include 16 paper presentations and three panel sessions covering "the role of the computer science department in the use of computers in the undergraduate curriculum," "the pedagogy of undergraduate education," as well as a presentation by NSF's Computer Group on "procedures for disseminating computer-based curriculum material for the social sciences."

Registration fee is \$40 for educational institution faculty members or government agency members, and \$75 for others. The conference coordinator is Bill Koteff, The Claremont Colleges, 91711.

Introducing the Pertec printer. High speed features on a medium speed printer at a surprisingly low cost.

It's a 132 column, 300 lpm printer. And a 160 lpm printer. A printer with Pertec dependability at a lower cost than most comparable single speed models.

It offers a variety of pre-engineered, plug-in options to complement your system as it was designed for it.

With full fault protection to instantly signal anything amiss, electronic top-of-form and skip-over perforation features.

It prints 6 or 8 lines per inch and accommodates up to 6-part forms without the need for mechanical thickness adjustment.

And it's simple to operate and unobtrusively quiet.

Of course you get the same assistance in design, development and maintenance of your system with our printer as you do with our tape and disk drives. Factory training for your service people. Back up by a service and support network spanning 30 U.S. cities and 20 foreign countries.

All because Pertec is serious about satisfying your system requirements. Contact us and we'll prove it.

Find out more. Call us collect in the area nearest you: Boston (617) 890-6230; Chicago (312) 696-2460; Los Angeles (213) 996-1333; London (Reading) 582-115. Or write us at 9600 Irondale Avenue, Chatsworth, California 91311.

The best values in
computer peripherals
come from

PERTEC

Already the world's
largest independent
manufacturer
of tape transports.



DATA GENERAL CORPORATION

DATA GENERAL INTRODUCES THE LOADED NOVA.

The loaded Nova is the new Nova 840 and the most comprehensive set of software/hardware capabilities ever available with a Data General computer.

It comes with a built-in Memory Management and Protection Unit that lets you expand main memory to 128K 16-bit words. Base price with 16K of memory is \$16,530.

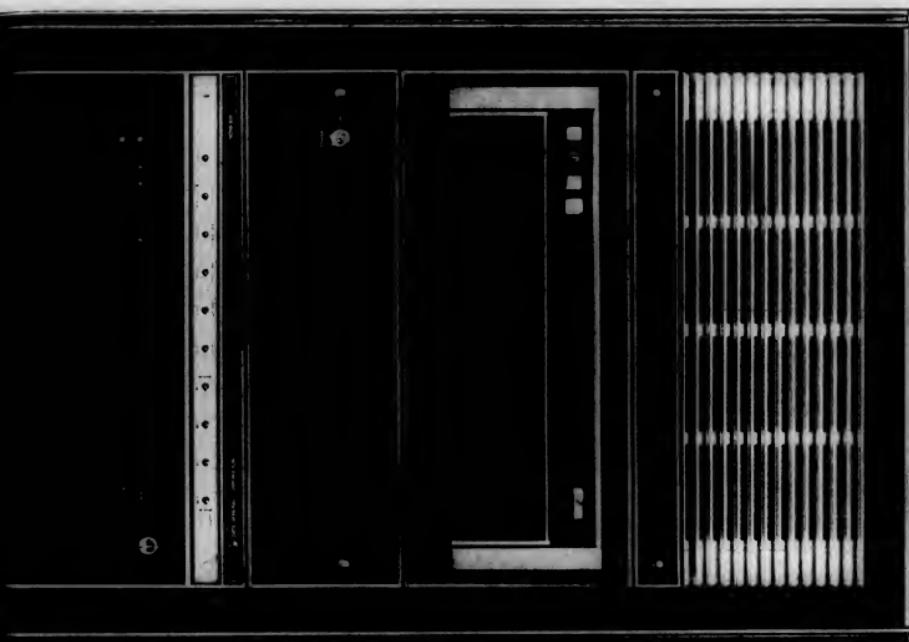
Nova 840 runs a comprehensive Real-time Disc Operating System (RDOS) for dual programming operations.

A new BATCH executive lets you pick your I/O devices, load your jobs, and walk away.

It has our new Fortran 5, Extended ALGOL, Extended Timesharing BASIC, and a whole library of proven Data General software; proven software that we can deliver now.

And our Remote Job Entry software can let the 840 double as a high-powered terminal to a big computer someplace else.

With the right kind of configuration (like the one shown), all that software is available free.



ON YOUR DOORSTEP IN UNDER 90 DAYS.

The Nova 840 in the picture has a central processor with 32 to 64K of main memory, a high-speed Floating Point Processor, hardware Multiply/Divide unit, fast-access disc storage, and 9-track mag tape.

The picture doesn't show lots of the other things you can get with Nova 840: line printers, card readers, Novadisplay terminals, fixed-head Novadiscs, moving-head discs, Nova Cassette tape, communications interfaces.

Nor could we show you the applications

and service experience we've developed in the course of building, installing, and supporting over 6,000 Nova computer systems all over the world.

If you're looking for more throughput than you could ever get with a minicomputer, for better access to system resources, at a lower price, call Data General.

Call with an order: we'll put a loaded Nova on your doorstep in less than 90 days.

 **DATA GENERAL**
Southboro, Massachusetts 01772

Sell the United Kingdom this September

The Computer Caravan is a proven way to market EDP products and services. Two U.S. Caravans have produced an attendance of more than 50,000 and a remarkable sales record. Now, we're moving to Europe, starting with a 4-city United Kingdom tour in September. We'll be visiting the cities of Birmingham, Birmingham, Birmingham, Edinburgh and London.

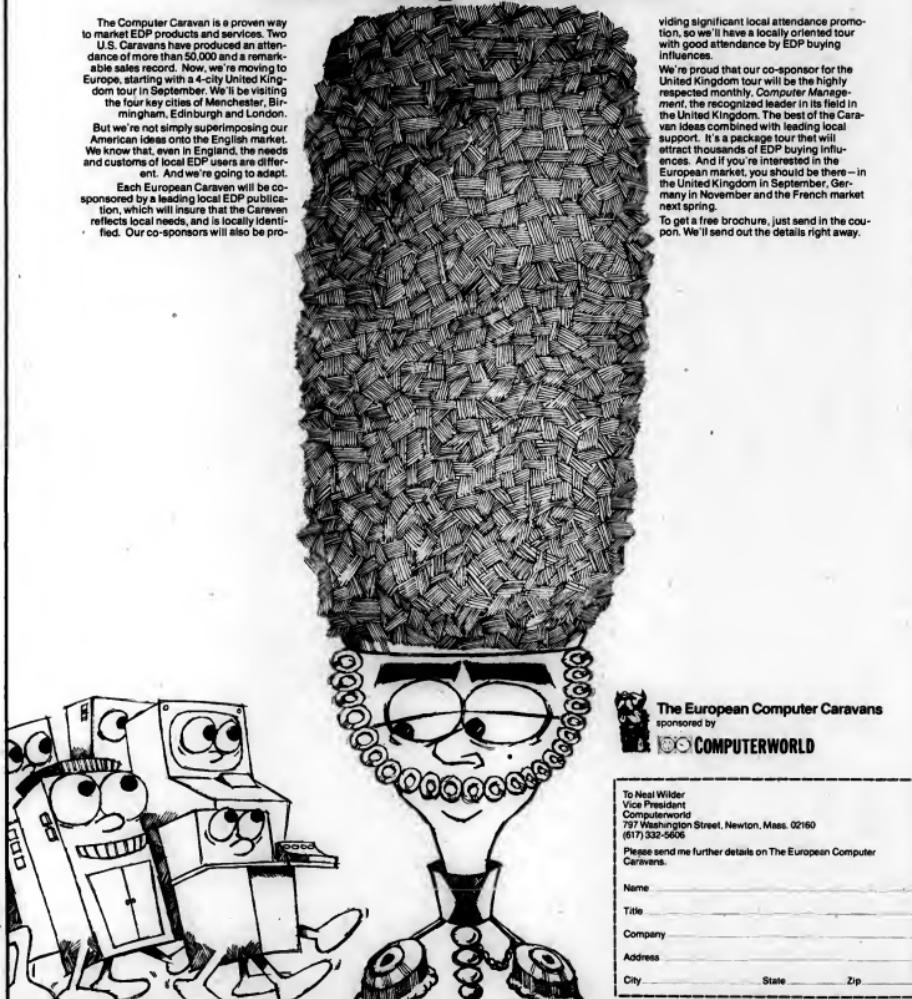
But we're not simply superimposing our American ideas onto the English market. We know that, even in England, the needs and customs of local EDP users are different. And we're going to reflect that.

Each European Caravan will be co-sponsored by a leading local EDP publication, which will insure that the Caravan reflects local needs, and is locally identified. Our co-sponsors will also be pro-

viding significant local attendance promotion, so we'll have a locally oriented tour with good attendance by EDP buying influences.

We're proud that our co-sponsor for the United Kingdom tour will be the highly respected monthly, *Computer Management*, the Kinnarac Computer Fair will be held in the United Kingdom. The focus of the Caravan ideas combined with leading local support. It's a package tour that will attract thousands of EDP buying influences. And if you're interested in the European market, you should be too—in the United Kingdom in September, Germany in November and the French market next spring.

To get a free brochure, just send in the coupon. We'll send out the details right away.



The European Computer Caravans
sponsored by
COMPUTERWORLD

To Neal Wilder
Vice President
Computerworld
797 Washington Street, Newton, Mass. 02160
(617) 332-5606

Please send me further details on The European Computer Caravans.

Name

Title

Company

Address

City State Zip

Long-Range Support Doubted

Present Programming Systems Had to Be 'Obsoleted'

(Continued from Page 1)

System/360 was designed to solve the problem, they said, since the goal of that system was to develop a compatible hardware and software line to bridge the entire IBM product line.

"Unfortunately, this goal was not attained. The hardware succeeded reasonably well in maintaining product line compatibility, while achieving its price/performance objectives," the planners said.

"With software was not so fortunate," they admitted, however. "The state of the art in software simply did not allow the creation of a single programming system that could survive within the space constraints of the small hardware configurations and yet support the sophisticated facilities required by the large-scale community."

Therefore, they said, three systems were developed: DOS for the small-scale user; OS for the larger scale; and TSS/360 to explore the technology of virtual memory.

The System 370 presented new problems because it was designed largely to run the same software. "However, the software must be upgraded to recognize certain hardware anomalies; support the new line of I/O equipment peculiar to the System 370 and to support the extended precision arithmetic hardware."

The addition of virtual memory, or for the "relocate" function as it is called internally in IBM with relocate apparently synonymous with dynamic address translation) will lead to fragmented software systems in the 1974 time frame, the planners indicated, noting that TSS/360/370 will still run in 1974 as well as AOS-II (VS-II), OS/360/370, AOS-I (VS-I) and DOS 360/370.

Relocate Unsupported

At the time of the study IBM, they noted, had already abandoned plans to develop a system which would have been a method for supporting relocate on the 370/145. Without it, they said, "the current programming system plan does not yet address the proper method of supporting relocate on the 370/145."

"This is particularly unfortunate at this time since the 370/145 has the relocated hardware built into it."

The widespread use of many different programming systems, the planners said, presents the same type of problems that were found with the great deal of

Profiles Built To Block Abuse

VANCOUVER, B.C. — The Unemployment Insurance Commission here has instituted computerized "abuser profiles" to help eliminate cheating in the system.

The commission hopes that by breaking down into categories the different types of abusers — such as those who collect checks while on holiday in Europe — it will be able to determine those people who the commission feels are most likely to cheat.

hardware incompatibility during the period right before the 360 — except they were in software.

At the same time, they noted, "functional deficiencies exist in the current software systems. Most of these facilities are required by the medium- and large-scale users during the 1970-1974 strategy period; however, the small-scale users are also affected."

OS Inability

The deficiencies, the planners

said, are primarily in the main-stream of the product line — that is OS/360 and its derivations — and have caused the marketplace potential of the computer data base/data communications and sensor-based applications to remain "relatively undeveloped because of the inability of OS/360 to react to these needs in a timely manner."

Even though the operating systems have "struggled manfully with the problem of satisfying current demand," the plan-

ners said that "nonetheless it remains true that it is increasingly expensive to make further additions to them."

"Indeed, it is increasingly expensive to keep them in good repair," the planners noted, claiming that user surveys showed many users would continue to use the outmoded systems through the 1975 time period.

Shape Up!

The continued inability to meet the needs of the market

"will enable our competitors to attack our installed base, and seriously reduce our revenue-generating capability," the planners said.

Because of these factors, the firm put together a team to design the functional requirements for a new system that was to become Q, a combination of hardware and software elements or subsystems designed to meet the user needs of the late 1970s and early 1980s as IBM forecast them at that time.



Blue Cross of Florida improves service with "Silent 700" ASR Terminals

*Silent 700** ASR twin cassette data terminals have been selected by the Blue Cross of Florida Plan, for their communications network serving 148 hospitals. Transactions are typed onto cassettes daily by hospital personnel for after-hours transmission from an unattended terminal to their central data center.

Increased claims load and expansion of services by the Blue Cross Plan required upgrading

their teletypewriter network. "We studied data terminals and the companies making them for two years before making our decision," reports C. R. Scott, Manager of EDP Planning.

"Silent 700 ASR terminals met our requirements. In addition, they are quiet...most important for our 148 hospitals. The terminals are attractively styled and the low price is vital."

Quiet electronic printing, cas-

ette storage, automatic search, and data rates up to 1200 baud make *Silent 700* ASR terminals powerful alternatives to conventional teletypewriters.

For more information on *Silent 700* terminals for your application, contact the nearest office listed below or Texas Instruments Incorporated, P.O. Box 1444, Houston, Texas 77001. Or call (713) 494-5115, ext. 2126.



See the "Silent 700" ASR Terminals at the National Computer Conference, Booth #215.

TEXAS INSTRUMENTS
INCORPORATED

Atlanta, Ga. (404) 525-1200; Boston, Georgia (404) 525-1200; Chicago, Illinois (312) 545-2380; Cleveland, Ohio (216) 464-1192; Dallas, Texas (214) 238-5318; Denver, Colorado (303) 733-5370; Houston, Texas (713) 635-5115; Indianapolis, Indiana (317) 273-3400; Kansas City, Missouri (816) 221-3434; Newark, N.J. (201) 687-2570; Orlando, Florida (305) 544-3535; Philadelphia, Pennsylvania (215) 543-6440; San Francisco, Calif. (415) 732-1840; Washington, D.C. (301) 899-7420; West Palm Beach, Florida (305) 544-2707; Frankfurt, Germany 069/441-7324; Bedford, England 0870-1-240441; Bad Godesberg, Germany 0211-898-7373; Toronto, Ontario, Canada (416) 899-7373.

*Trademark of Texas Instruments Incorporated

We've made getting around the dial network at 4800 bps a lot faster this year.

4800 bps is a lot faster than 2000 or 3600. But it can also be faster than 4800 bps. If it's the Codex 4800 Dial Modem with automatic and adaptive equalization. Because it keeps going when other modems, even at lower speeds, won't operate. Codex developed a unique modulation scheme so that the unit is relatively immune to otherwise troublesome dial network parameters. This, coupled with the fastest automatic and adaptive equalizer which takes only 140 ms to set up, provides the highest block throughput on any dial modem.

The Codex 4800 Dial Modem can be substituted directly for the Bell 201A. And since it is completely transparent to all data and control formats, software is unaffected. A half-duplex configuration provides a turnaround time of 40 ms.

For more information about how you can pick up speed on the dial network, call us or write. We can give you more than just products like modems and multiplexers that are fast. Codex can give you the equipment, people and concept to manage your data communications facilities. Codex Corporation, 15 Riverdale Avenue, Newton, Mass. 02195. 617-969-0600.



codex
We'll get you through

Extend Features to Non-Programmers

'Q' Must Be Usable by the Public

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — One of the major requirements for System Q, the computer system planners in 1970 said, is that it be a "usable" system, not just by programmers, but also by the general public.

This requirement "will have the most profound effect upon the entire system. Every other requirement for System Q will be subordinate to this requirement," the planners agreed.

In addition, they said, "Every function and feature proposed for System Q must be evaluated in the context of the system will not be become surrounded by the jargon characterizing the human interfaces today."

"The system must be usable by people who are not programmers, not professionals, not college graduates and not necessarily high school graduates," they said.

User interface must be considered at least on an equal footing with performance by the designers of the system, they added.

The designers also made it clear that the system's goal was to be more useful to programmers and general installation management, the System Q functional specifications showed.

How did the designers plan to accomplish this usability goal?

Extensions Needed

"To meet this objective, extensions must be made in the areas of languages, data handling and system facilities," the designers pointed out.

To extend the features of the system to non-programmers, the study group recommended that the following language capabilities be provided:

"1. A layman's language to facilitate system use.

"2. A general-purpose query update language (a proper subset of the layman's language).

"3. A Common Command Language by which, with equal facility, operators may effectively manage both simple and complex installations.

"4. Language facilities that emphasize simplicity of user, provide inherent tutorial capabilities (e.g., leading by hand, etc.), allow natural subsetting into learner languages and natural extensions for complex applications, etc. for items 1 to 3 above."

"5. Facilities to implement occupational or problem-oriented languages designed for specific users or applications and based on industry terminology."

In addition, the system will have several new features to aid the programmer, if the goals of the designers are met by the implementation team even now at work on the project.

Data Independence

First it will have "extensions to current languages to provide implementation of data independence, the identification of parallelism within programs, the variable binding of programs to system resources, and to provide data flexibility to meet user requirements."

Another programmer-oriented feature will be the "expansion of compilers to provide interactive execution for complex applications, problem-oriented program development and debugging," and "the introduction of all new functions via the primary higher-level languages of the marketplace."

There would also be the "minimization, if not the elimination, of requirement to use lower-level languages for new functions."

In addition, System Q will be designed for "complete compatibility within a language family, the ability to 'cross-terminal or batch mode,'" and will have learner languages as proper subsets of the full programming languages offered," the planners said.

"To increase the general usability of a system, it is necessary to eliminate or minimize those artificial constraints or

inherent problems associated with the processing of data," the planners continued.

"To this end, five essential requirements have been identified: data independence; variable binding of data to procedures (program); data migration and interchange; data integrity/security; data journaling and recovery."

In the area of data independence, the planners noted this is a general term for freeing a program from the external conditions upon which it is not logically dependent and found that there were many ways to do this.

"However, the gross market requirement is viewed as separating the application procedures (programs) from the physical data representations, relationships, addresses and ownership," they said.

The requirements call for a system that would be data independent in the areas of data manipulation, data migration and interchange.

Variable binding, the planners said, "refers to the time at which the logical data and the physical addresses are bound." The marketplace of the

(Continued on Page 46)

MOVING?

Please notify Computerworld at least four weeks in advance. When moving, attach your old address, phone, notice of recent mailing label. The code line on top may not mean much to you, but it is the only way we have of quickly identifying your address. If you are receiving duplicate copies, please send both labels.

797 Washington Street
Newton, Massachusetts 02160

**Volume
Key
Punching**
(402) 346-0330

"JUST
MINUTES
AWAY"

COMPUTER
MARKETING
CORPORATION
1000 KARNS ROAD
REDICK TOWER
OMAHA, NEBRASKA 68102

System 370 LEASES

COMPUTER
MARKETING

COMPARE 370 LEASE PLANS

| | IBM | alanthus |
|------------------------------|-------------------|---|
| TERM | 4 YEARS | 4 YEARS |
| RENTAL | 100% MAC | 88% INCLUDING MAINTENANCE |
| 2 YEAR TERMINATION PENALTIES | 6 MONTHS RENT | 2 MONTHS RENT |
| ITC | 4 3/4 % | 7% |
| RENEWAL | ANNUAL EXTENSIONS | MONTH TO MONTH |
| | | In addition: call us for our unmatched 7 & 8 year financial leases. |



alanthus

ALANTHUS CORPORATION

The 370
Leasing Company

White Plains, N.Y. (914) 428-3703

Oak Brook, Ill. (312) 654-4635

Palo Alto, Calif. (415) 326-0750

Atlanta, Ga. (404) 252-2991

Programmer, Installation Manager Aids Featured

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — The plans for System Q call for the inclusion of special features to aid programmers and to help installation managers configure and manage their systems.

The programming aids will primarily be to help the programmer "in developing facilities for the non-programmer to use."

"This prime emphasis is in the area of improved program debugging tools, including symbolic debugging facilities for applications programmers, a support system which provides for control of program executions during debugging tools, and a systems debugging package for the system control program which can be inserted dynamically as well as statically."

In addition, the planners said environmental dependencies within the system should be transparent to the user such that "changes in the configuration of the systems do not affect previously checked out and properly running programs."

For the installation manager, IBM is planning a whole bagful of useful new tools for the System Q environment.

The first will be aids that help in selecting systems and configurations to "assure the selection of a configuration that is optimal with respect to installation requirements."

To do this, the planners said, "a series of system design tools must be provided to assist the customer in evaluating his system design and operational algorithms so that he can intelligently construct a system to meet his needs."

"These tools must include a set of system performance profiles that identify and quantify the performance characteristics of critical components within the system."

The performance of these components might be measured and expressed in terms as size of data base, number of accesses per transaction, number of terminals per system, etc.

"In addition, performance might be further delineated in terms of system en-

vironment with separate quantifications for batch, interactive and event driven processing, and for any combinations thereof."

"In this way, it should be possible to determine the impact of one environment on another when they cohabit the same system and share critical resources," the designers said.

Simulation Model Support

To provide this type of information, the planners said the system must be supported by simulation models "which are based upon the figures of merit and properly demonstrate the interrelationships of these performance criteria so it is possible to accurately predict the performance of a given configuration in a given environment."

Input to the simulation models could be either manual descriptions of expected requirements or statistical and trace data collected by the system during the course of actual operation, they added.

In addition, the planners said, after a

system is installed it should have facilities for measuring its performance in actual operation. These measurement tools, they said, should be integrated within the system.

"The system must be capable of maintaining and displaying, on a dynamic basis: its own status and that of tasks, jobs, data sets, etc.; system performance; the utilization of components — hardware (CPUs, disk drives, DASD, terminals, etc.); system workload and other statistical information as may be required."

The planners also indicated the new system must have provisions that allow the computer configuration to react dynamically to its environment "so that it remains in concert with installation requirements no matter how rapidly or drastically they change."

Maintaining Balance

"This responsiveness should include both a self-adaptive capability and a sensitivity to operator stimuli that enhances the system's facility for maintaining the balance between resources and requirements."

To meet this need and to minimize human intervention in the process, the planners said the "system should dynamically allocate resources and schedule activities against varying workloads so that the installation's throughput, turnaround time and/or response time requirements are satisfied."

Furthermore, there will be automatic error recovery procedures built into the system which would be started automatically and would include system re-configuration, and would have on-line analysis of the parts in the system that failed.

'Q' Must Be Usable For Non-Programmers

(Continued from Page 45)

seventies will facilitate both batch and interactive data processing [the two extremes for binding]; thus both extremes are required with degrees of early or latency in-between so that customers in application development of casual users can select the appropriate option with its flexibility/performance trade-offs," they said.

The requirements of data migration and data interchange must be facilitated on System Q, the planners said, so that users can have their existing application "data transverse from the source system to the target system dynamically," and the portability of the system and programs must be guaranteed.

In the areas of data integrity and data security, users will require more of their operating systems in the seventies, the planners noted.

They said provisions should be built into Q to help insure the accuracy of data in data bases (so that, for example, two concurrently operating programs using one data base cannot both update it simultaneously).

In addition, data security provisions should provide that "the use of data should be selective by specific programs, terminal users, operators, etc." at the option of the using installation.

Lastly, the planners said there should be more provisions for data journaling and data recovery in the new system.

"Data journaling and data recovery are interdependent in that customers require the capability to journalize the data entries to the data base in a chronological sequence to be able to reenact the transactions with the 'original' data base for recovery and recreation."

Keeping River Quality High
RICHLAND, Wash. — Battelle-Northwest scientists are making a computer model of a 100-mile stretch of the Chehalis River to help local planners predict what new waste sources or water treatment plants would do to water quality.

We've been making data communications systems for a long time. Ever since day 1 — more than 6 years ago.

Everything from our own data communications processors to complete turn-key systems for people like banks, manufacturing companies and even police networks.

So when it comes to getting the message through, nobody knows more about how than we do.

Introducing the Interdata Message Switch.

Now we're announcing the next big step in the Interdata plan to solve your data communications problems — a completely new, turn-key message switching system — MS-5.

It's a total system designed to increase the efficiency, speed and reliability of your data communications operation. And to do it all at a cost significantly less than you're paying now.

MS-5 is great for international operations, gives you complete terminal and network flexibility and is compatible with virtually any carrier — ITT, RCA, ATT, WU, WUI, GPO or even your own private satellite.

One for all; all from one.

Perhaps the best thing about the Interdata Message Switching System is that everything — hardware, software, system design, installation and testing — comes from the same place. A single supplier. And a supplier who's been designing, building and installing similar systems for years.

That's Interdata.

All those data communications systems we've sold and installed already make a tough act to follow.

But you ain't seen nothing yet.

2 Crown Point, Parsippany, New Jersey 07076 (201) 229-4000
Denver — (303) 423-4210; Dallas — (512) 244-1000
Seattle — (206) 523-1120; Denver — (303) 423-4210; Dallas — (512) 244-1000
Denver — (303) 266-5616; Houston — (713) 783-1630
Seattle — (206) 523-1120; Dallas — (512) 244-1000; Atlanta — (404) 958-0862
Palo Alto — (415) 965-1100; Philadelphia — (215) 436-5575
London — (171) 785-5200; Toronto — (416) 879-1500
West Germany — (081) 954-3887; Tokyo — 270-7711



Security, Privacy Major Parts Of 'Q'; IBM Will Provide 'Tools'

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — Privacy and security features will be a major part of the Q if the software designer can meet the functional specifications laid down by the planners who set the requirements for the system.

Noting that "privacy becomes increasingly important as customers capture more data and increase the availability of the data to multiple users," the designers decreed that the system must provide the customer the necessary tools for privacy in his data processing installation.

"However," they claimed, "IBM cannot realistically provide generalized 'privacy' in our products, but can assist the user customer in achieving his desired degree of privacy by giving him the tools to accomplish this task."

User Prerequisites

To do this, the entire system "should be constructed with the point of view that data is private to its creator (owner) until and unless he stipulates otherwise, that the users of the system are granted certain prerogatives by the management of the installation beginning with the right to access the facility in the first place, etc."

"The system must be constructed in such a way that its own integrity is assured and any compromises of that system security must be chosen explicitly and overtly by the customer in the interests of achieving some other objective, such as improved performance or operation flexibility."

One of the methods of providing greater security will be multiple-level authorization schemes in the system.

The authorization schemes will include authorizations for fetching, storing, dele-

tion, execution and exclusion, the planners said.

"These options would include authorization codes designed at the applications level. The system must enforce its own security in each of its major areas including batch operations. The installation management will be given methods of prohibiting certain users from operating in one or more of the supported modes of operation, such as batch, conversational, remote job entry, remote tape, etc."

"Further, the customer shall be able to restrict certain users from accessing certain devices, executing certain programs, and in general, using the system in other than the way the installation intends."

There will also be ways to insure the integrity of the system built into it, the planners said, but they were not specific on how this would be done.

In addition, there will be an audit function within System Q.

As an installation option the user should be able to record and analyze all attempted breaches of security to facilitate detection of security problems and alteration of security procedures."

There will also be provisions for network security, the planners said, covering "all" the security aspects of networks.

This type of security necessitates increased hardware. "When considering multiple-node networks with programs and data being transmitted and perhaps being executed at 'unknown' nodes of the net. 'A simple case is where two enterprises in a related industry who are potential competitors might be executing programs on the same node of a network and the isolation problems that occur for their data and programs... Security is a prerequisite to the widespread use of networks in the seventies."

RAS Features Must Be Integrated

TULSA, Okla. — "The reliability, availability and serviceability (RAS) aspects of the system are among the most significant" requirements of System Q, according to the designers of the system.

"The inevitable consequence of a system such as Q is that people come to expect it to be there in a fully operational condition at all times, rather like the telephone or telegraph or television industry equipment," they pointed out.

This is especially true, the planners said, as the system becomes more widely used in such areas as interactive processing and in the sensor-based applications areas such as process control.

"Because of the significance the users will attach to RAS, these features of the system should be fully integrated into the hardware/software package so as to provide predictable levels of availability for a given configuration."

In addition, they told the programmers that "provisions should be made for the graceful degradation of system performance when components fail and for the automatic reconfiguration of the system to isolate and bypass failing components."

Also, the system "should provide for automatic journaling and for the recovery of data in databases in the event of major system failure. System restart should be fully automated so that minimal operator action is required. Fully automatic restart, possible with reconfiguration, should be available as a system option with operator-dependent factors (such as date and time of day) maintained externally from the system."

Also, "a system debugging package with local and (at customer option) remote access must be available which permits the customer to properly initiate, identify, log and document problems to his program support customer engineer."

"I want to run the best damn computer operation in the world."

That's the expression we hear most from our customers. To put it bluntly, efficiency is the only thing that counts today. Finding new ways to improve performance. Optimizing what you've got. Extending capacity just when everyone else thinks you're running out of gas. The goals are clear. And, the tools and know-how are in one place. At Testdata. Programs such as DEADLINE and STREAMLINE for system and center scheduling. Tools for measuring performance—from the inexpensive MICRO-STAT to the comprehensive 1100 Series Computer Monitor. And systems for monitoring, simulating, upgrading, reconfiguration, alternatives, or new equipment through CASE. They're all in use.

If you're looking for ways to improve your computer operations, get in touch. We'll give you a complete rundown of Testdata's tools for performance improvement. Clip the coupon or call for our Red Brochure.

Tesdata
SYSTEMS CORPORATION

7900 Westpark Drive
McLean, Virginia 22101 (703) 790-5580



To: Testdata Systems Corporation
7900 Westpark Drive / McLean, Virginia 22101 / Phone (703) 790-5580

Yes, I want to run the best damn computer operation in the world. Send me the brochure.

Name _____

Organization _____

Address _____

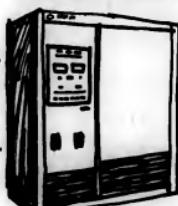
City _____

State _____ Zip _____

Phone _____

For more information, call or write:
Testdata Systems Corporation
7900 Westpark Drive / McLean, Virginia 22101 (703) 790-5580

**415 cycle computer power
all solid state**



Every year more CPU's require 415 cycle power. Now IBM's 370/655 and 370/685 join the 360/85 and 195 in utilizing 415 Hz power joining various CDC, GE and Univac models. Typically, motor-generator conversion units have been employed to provide the higher frequency, but Avtel offers an all-solid-state conversion with superior performance, lower operating costs and instant frequency as good as existing choices. Available in standard or non-standard configurations, Avtel's solid-state converters can also be quite efficient and easy to install. Most models are convertible to Uninterruptible Power Systems (UPS) if desired. All models are fully compatible with computer power requirements. For further information, prices and leasing terms contact:



AVTEL
CORPORATION
an Airtronics Subsidiary

1130 EAST CYPRESS STREET - COVINA, CALIFORNIA 91724 - PHONE (213) 331-0661

Visit us at Booth 2731 during the National Computer Conference for demonstrations of new computer performance improvement tools.

Users Benefit as Competition Improves A/V Courses

Comparing the newly released sixth edition of the *Guide to Audio/Visual Materials for Data Processing Instruction* to prior editions reveals almost two-thirds of the training firms born by IBM's unbundling no longer exist. Despite the fall-out of firms, however, the scope of courses available continues to widen.

This year's edition of the annual guide shows three independents expanding their libraries of products. Advanced Systems Inc. (ASI), Deltek and Edutronics now provide courses on all the major and many of the minor topics in the DP field.

More courses come state-of-the-art subjects: all three vendors have released courses on virtual storage. Nevertheless, general-purpose courses such as Fortran, Cobol, system analysis and design are available too.

In addition to the products listed in the new A/V Guide, the chart section of which has revealed courses on product changes which will be released during the next six months.

ASI Converts to Color

ASI has joined the color ranks, making its library available on reel or cassette form. This step is important for users who can now utilize the offerings of all three vendors through one viewing unit.

George Ravazzola, ASI president, reported a cost/benefit analysis course will be available in 90 days. The 4-module course will sell for \$1,200. The entire System Analysis and Design series of 36 modules is being revised and will be released throughout the next year as each module is completed.

ASI is also expanding its applications courses. Although now confined to manufacturing, the series will be enlarged in the fourth quarter to include units on purchasing, inventory control and shop floor control.

ASI's introduction to IBM S/370: Concepts and Facilities should be released by July 1. The 5-module course will sell in the \$1,000-\$1,200 range.

The S/370 course on computer operator training will be available August. This 5-module course will also sell for somewhere in the \$1,000-\$1,200

range. Deltek's 80-module VS series will be completed before the year ends. Robert K. Deltek, president, has announced availability of the VS1 Operators course (7-module) by mid-June and the VS2 (Release 1) Operators



J. Daniel Couger
On
Education

course (7-module) by August. The VS Programmer course (25 modules) will be released by module, starting in July. Ed Musselwhite, executive vice-president, reported the ANS Cobol series will be ready in June. Deltek's course is aimed at the entry level programmer.

A new 4-module database course will be ready this month and two DOS courses will be released in the fall. The 12-module operators course should be ready in September and the 15-module programmers course should be ready by January.

A new system analysis and design course will be produced by

Edutronics. The 22-module course will be based on my own book, *System Analysis Techniques* (John Wiley and Sons, Inc.). George Howard, president of Edutronics, has also announced an eight-film course in data communications, produced in cooperation with Eastern Airlines.

State-of-the-art courses in IBM S/370, VS2 and VS1 and VS2 (Release 1) will be released in the near future. A new 10-module Job Control Language course equips the student with a working knowledge of JCL.

The course is divided into two sections: Elements of JCL and

JCL Coding Techniques, making it possible to run classes in parallel for two levels of students. A price of \$1,000, the course gives suggestions for avoiding problems as well as covering proper operating procedures.

The sixth annual guide to A/V materials for data processing contains descriptions of products of 12 firms. The guide may be acquired for \$3 from the University of Colorado, Cragmor Road, Colorado Springs, Colo. 80907.

Couger is professor of computer sciences and management at the University of Colorado.

Wiltek data commun can move all th of typewr a big corporati



The Wiltek difference. The Wiltek terminal combines high speed with the ability to batch data and transmit it automatically over standard dial-up facilities. Two unique 50,000 character storage buffers are built into the Wiltek terminal. One temporarily stores incoming data, the other outgoing data. The buffers enable the terminal to send and receive large amounts of data during a single call — and with no interruption of data entry. Data moves fast, phone calls are brief. Transmission costs go down more than 50%!

The Wiltek Model 300 is the most economical Wiltek keyboard entry terminal, suitable for low to medium volume locations. Like all Wiltek terminals, the Model 300 automatically makes error checks during transmission. At a large oil company which recently installed 300's in its regional field offices, terminal operators used to spend hours each day re-entering garbled messages. Automatic detection and re-transmission has resulted in more efficient operation and considerable cost savings.

The Wiltek Model 400, with its 30 cps KSR, is perfect for high volume locations. Several corporations use the Model 300 (left) at all remote locations and the Model 400 at corporate headquarters. A packaging company uses 400's at a central location to receive reports from offices around the country on the status of shipments in transit.

Course Reviews

'CPUs-on-Chip'

SILVER SPRING, Md. — Designers and others familiar with digital circuitry can get a better understanding of the various "CPU-on-a-chip" computers through a course on microcomputer selection and programming offered by Software Technique Inc.

The course includes a seminar and workshop sessions. The seminar provides an overview, with discussions and comparisons of all the known microcomputers. Each is then individually covered and made available for hands-on experience in a workshop environment.

Presentations at client offices start at \$1,000. This works out to an average cost of about \$75 per student based on expected class sizes, a spokesman said at room 1125, 8811 Colesville Road, 20910. —

and save hundreds of dollars in

Mini Monitors Student Progress

UTICA, N.Y. — The Board of Education here has purchased a microcomputer to monitor student progress in reading and mathematics skills in a pilot education program.

The Comprehensive Achievement Monitoring System (CAM) was developed by Dr. Olcott Gardner of the Jamesville-DeWitt Central School, under a grant of federal funds.

The New York State CAM project is the pilot project in the nation for the installation of this particular educational software on minicomputers, Gardner said.

"The purpose of CAM," Gardner said, "is to accomplish program assessment for a particular course or grade level, to determine where certain objectives are taught, the percent mas-

teries after they are taught and where certain objectives lose retention."

The program breaks objectives into individual Learning Activity Projects (LAPs), enabling each student to program at his own rate. As each LAP is completed, the computer scores the project, prints out a result sheet for the instructor and stores the information.

"One asset of this program," according to Ronald D. Ayer, Utica administrator for research and development, "is the ability to retrieve grading and statistical output for each individual student at any time."

The school uses a 4K PDP-8, with two magnetic tape decks, card readers, teletypewriter terminal and printer.

X-Ray + DP 'Make No Bones' About Assessing Skeletal Health

By Ken Shonk
Or the CW Staff

DAYTON, Ohio — Using an inherited, left-over optical scanner and a Linc-8 computer, neither of which had the exact capabilities needed, a research group at Wright State University here has assembled an electronic system for assessing the health of the skeletal system X-ray of the hand. The system, which measures bone density, is capable of detecting changes in the amount and kind of bone mineral substance long before visibly discernible changes take place, according to Prof. Charles Colbert, director of the project.

"Since we had to make do with what we had, assembling the equipment for the job was one of the real challenges," Colbert explained. "The photodensitometer used to operate the X-rays, for instance, was never designed to talk to a computer, and the Linc-8 was never designed to handle the multiprogramming mode we needed to operate in."

Colbert's graduate assistant, Henk Vanhulst, a physics graduate from Antioch College who had no computer experience before the project began, designed a way of swapping parts of the program between the disk and the memory. He also designed the multiprogramming system for the Linc-8, a laboratory-oriented computer from Digital Equipment Corp., which is the predecessor to the PDP-12.

The photodensitometer scans the X-ray of the three middle fingers of the left hand, taking gray level readings for the middle bone of each finger and transmitting the data on-line to the computer.

"The computer, which senses when the beam crosses and leaves the bone, images the beam and aligns it based on the physics of what happens to X-ray photons when they penetrate a body part and expose film, to calculate the radiological weight and the area of the bone (a measure of the size). By simple division, the computer divides the radiological weight of the bone by its size.

"The computer compares the measured value for a patient to norms we've established from measurements on a large number of normal men and women of all ages and which depend only on sex and age," Colbert stated. "Once we plug in the patient's sex and age, the computer goes to the appropriate density curve, prints out the patient's measurements, the normal values and range and a comparison as either a percentile ranking or a qualitative ranking."

Comparing the rankings to particular patterns found to be characteristic for certain bone disorders, the computer can also make a preliminary evaluation. Colbert pointed out, "A finding of overweight, overdense bones together with normal size and skeletal age might indicate lead poisoning. Overweight, overvoluminous and overdense bones combined with normal skeletal age is characteristic of patients with congenital rickets over-treated with Vitamin D."

Colbert noted that this project has concentrated on making the system a clinically workable tool in both diagnosis and treatment of bone disorders.

communications terminals are different kinds written data on generates...



The Willtek Model 350 is used where many copies are required or where almost continuous operation is expected. A chemical company uses 350's at its regional offices where sales orders are entered on four-part forms, and at its plants where the orders print out on eight-part forms.

The Willtek Model 520 terminal transmits punched card data from remote locations. A major manufacturing corporation has installed Model 520's to transmit payroll data from forty plants to a single computer center for centralized processing. The same system also employs Model 400 terminals at all locations to handle administrative messages.

The Willtek Model 500 terminal uses an advanced CRT with 2000-character display. The 500's editing features make entry of formatted data fast and easy. A nationwide delivery service using the Model 500 to enter package tracers increased operator output by 50% over the previously used teletypewriters.

Our new booklet shows how Willtek's terminal concept can make corporate data communications more efficient and less costly. Write Robert Coilea, Commercial Marketing Manager, Willtek, Inc., Glover Avenue, Norwalk, CT 06852.

WILTEK

ds of thousands the process.

NEED TRAINING?
360/30 Maintenance
Summer Classes Now Forming

| CLASS | DATES |
|----------------------|-----------|
| 360/30 CPU | 7/6-7/27 |
| 180/30 Processor I/O | 7/17-7/27 |
| 180/30 Processor I/O | 8/15-8/21 |
| 332 Orientate | Monthly |

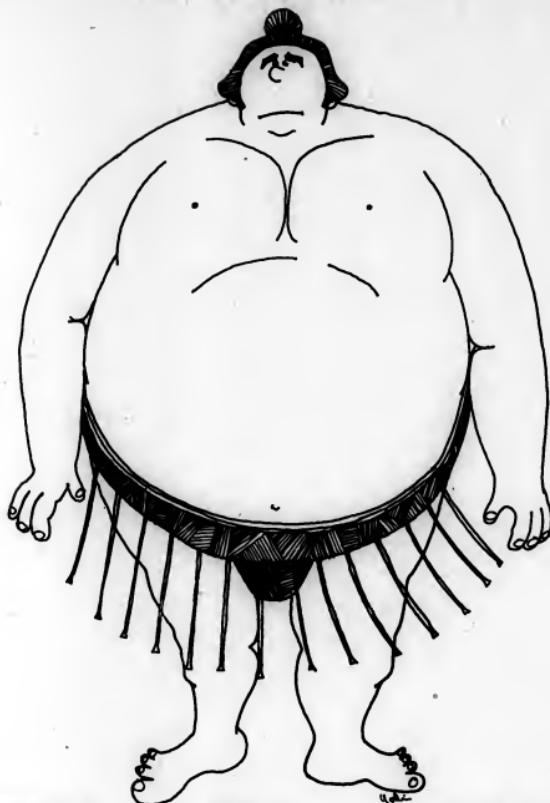
For further information
Contact Our

EDUCATION CENTER

1000 Dillinger — (215) 525-6798

BORRUS INC.

Service Company
875 Franklin Street
King of Prussia, Pa., 19406



And in English, it means "Computer Weekly." Whatever you call it, Computerworld's the fastest publication in an excellent vehicle for selling EDP products and services in the large and expanding Japanese EDP market. Here are some of the reasons why:

- Shukan Computer is a joint venture of Computerworld and Dempa Publications, the leading Japanese publisher of electronic information services. With the combined resources of the two companies, Shukan has the largest news gathering organization of its kind in the world.
- Shukan Computer is the only newsweekly for the fast-growing Japanese computer community.
- Initial circulation is guaranteed at 35,000, divided about 80% to end-users and 20% to the computer industry. Circulation development methods currently under way are the same as those which gave Computerworld the highest paid circulation in its field in less than four years.
- Shukan lets you in on the action in the world's fastest growing EDP market. The Japanese Ministry of International Trade and Industry (MITI) reports the following 1978 forecast: 35,000 general-purpose systems installed, up from 11,237 in 1971; 11,000 minicomputers installed, up from 1,870 in 1971; and 3,000 industrial systems installed, up from 1,008 in 1971.
- Is this growth likely? The latest census of general-purpose systems revealed that there were 14,806 systems installed as of September 1972, a one-year gain of 3,569

New heavyweight in the Japanese Computer market:



In Japanese,
it's called
Shukan Computer.

units end \$911 million installed value, a growth of 31.7% and 23.1%, respectively. And more than 50% of these new systems are now in use.

It is true that there are some import restrictions. But Japanese vendors and users can get permission to import almost anything they want and need. As a result, 1972 imports were over \$360 million.

• Advertising in Shukan is easy. With Computerworld representatives in the U.S. to assist you, it's easy to place space in Shukan. For a small fee, we can translate and translate and then from English to Japanese. To get more facts, just send in the coupon.

To: Neal Wilder, Vice President
COMPUTERWORLD
797 Washington Street
Newton, Massachusetts 02160
Please send me more information on Shukan Computer advertising.

Name _____

Title _____

Company _____

Address _____

ZIP _____



COMPUTERWORLD

COMPUTER INDUSTRY

CI Notes

Brokers Order Teleguide

TRUMBULL, Conn. — Five national brokerage firms have signed orders totaling more than \$6 million with Bunker Ramo Corp. for its System 7 and Telequote stock quotation services.

The contracts include about 3,400 desk units in 286 main and branch offices of Hornblower & Weeks-Hemphill; Noyes, Inc.; Harris, Upshur & Co., Inc.; Sherman, Hamill & Co., Inc.; Thomson & McKinnon Anchincous Inc.; and Hayden, Stone, Inc.

Similar contracts have already been signed by E.F. Hutton & Co. and Dean Witter & Co.

Under the contracts, the firms have the option to interconnect the Bunker Ramo terminals with their own computers.

Tally, Ball Talk Financing

KENT, Wash. — Cash-hungry Tally Corp. and Ball Corp., maker of glass containers and electronic products, have reached preliminary agreement on an arrangement to provide Tally with financing.

Under the terms of the agreement, Tally would issue to Ball warrants to purchase about 1.6 million shares of common at \$3 a share.

Tally said the agreement is subject to certain conditions, and if completed is expected to provide "adequate funds to meet the requirements of its current programs."

GTE Unit Seeks Logic

WHITE PLAINS, N.Y. — GTE Information Systems, Inc. is negotiating to acquire Logic Corp., a key-to-disk input systems maker.

Any agreement would not exceed \$2 million, in cash or stock, and would be subject to approval by the boards of directors of both companies and by Logic's shareholders.

Logic makes key-to-disk units in addition to data collection and preparation systems. GTE Information Services markets data communications equipment, software services and systems.

Wescon OKs Floor Sales

SAN FRANCISCO — The Western Electric Show and Convention (Wescon) has issued a "qualification" announcement indicating that, while not delivered as products, will be permitted to occur on the floor of the show. Previously the permissibility of on-the-floor sales was a grey area.

Supershorts

Data 100 Corp. has shipped its 1,000th Model 70 remote batch terminal, which it started producing in April 1970.

Computer Services Corp. has created a Software Products Division, and said it will soon announce a new product.

What the Papers Say

IBM Planning New Data Entry Family

TULSA, Okla. — The 3740 will not be IBM's only data entry product, according to minute of a 1972 IBM management committee meeting revealed in the *Tele*-*Com*.

In fact, the minutes show there was a general level of opposition to the introduction of the 3740 on the part of the IBM Data Processing Group which wanted to wait until the firm was prepared to offer a new modular series of data entry equipment.

Some Disatisfaction

The group reportedly opposed the introduction of the 3740, known as the Viking system, because it was "driving for a family of data entry units based on the universal controller in SDD (System Development Division) in order to offer the marketplace several related products as opposed to one-of-a-kind units like Viking even though market entry will be admitted late."

The group argued that the Viking's projected life of 70 months did not take into account the new family of systems under development.

Because of this, the group found the Viking program to be one of high risk and one that did not offer "any promise of sustained leadership in the data entry marketplace."

Morcom Intelligence

The group downgraded the Viking system because it felt the data entry marketplace had a very definite requirement for intelligence in the system, "particularly with the principal competition of the clustered key entry systems," the minutes show.

The group had killed the Viking project in late 1971, but World Trade Corp. took the matter to the management committee for resolution.

Both the corporate marketing people and the management committee agreed with World Trade and ordered the program reinstated, the minutes show.

At that time, early in 1972, the company had already invested \$7 million in the program and expected to invest another \$7 million before the product was to be marketable.

However, the profit projections for the system were not up to the usual high levels expected at IBM, the figures show. Based on a 70-month life, the unit would produce a profit of only 11.6% worldwide, with the U.S. profit pegged at 13.7% and the World Trade profit at 9.3%.

The New Family

The new family of systems that will replace the Viking program will be completely modular.

"The plan called for a family of products using standard technologies as basic building blocks in the keyboard, display,

control unit and printer areas which will permit both key entry products and customized industry terminals to be developed with maximum commonality and attendant benefits," the management committee was told.

The committee recommended that the work continue on this family of systems in the Systems Development Division during the 1972-73 budgetary period, noting that the "benefits to be derived from different approaches... could well justify the duplicate expenditure involved."

Although no target dates for the announcement of the new systems are mentioned in the minutes, it is clear that IBM does not have a product that is at least near

to the market stage that will compete with clustered data entry stations made by several independents.

The decision to announce the product will apparently be a marketing one, since IBM will have to carefully consider the impact of the new system on the already announced 3740.

The strategy that will be followed probably will be to delay the announcement as long as possible if it appears that the Viking program will meet its goals.

However, if the Viking program is seen to be falling short of those projections, then the firm might rush its new family of data entry systems to the market faster than it would have otherwise.

Dropping of Midas System Hints At IBM's Disk Drive Strategy

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — Apparently the Midas disk drive project at IBM did not have the golden touch of its namesake.

Primarily for marketing reasons, IBM has "terminated" the project to market an approximately half-density 3330, and the cancellation of the Midas program may give a significant glimpse at IBM's future disk drive strategy.

The Midas system was part of an overall IBM program to enhance the 3330 during its projected lifetime, apparently to keep independent producers and users off balance.

Midas itself was to have a maximum capacity of 60M byte/disk as compared to the 3330's 100M byte/disk and was to have had eight of the 3330's read/write heads removed for its operation.

However, the IBM marketing department discovered that the Winchester drive, as the 3330 would have a 30% to 35% price advantage over a Midas system with four five spindles. Therefore Midas was dropped even though the project had been fully developed at the firm's San Jose disk development facility.

It is clear from some documents that IBM wants to press its Winchester technology now while it has little competition in the area of the read/write heads in the disk pack rather than the disk drive.

Presently the firm has a clear edge in this area, and it is known that the independents will probably have a hard time finding disk pack suppliers capable of integrating the heads into their packs, which will force them to develop the packs themselves.

This could be an expensive and unwarranted process for the smaller firms in the business, and in fact could force several of them to the wall if indeed IBM

is successful in making Winchester and its follow-ons the standard for the industry.

With their development dollars tied up in the 3330, and with the development of 3330-like devices the independents will be hard-pressed if IBM cuts off the 3330 enhancement program as it appears to be doing.

The independents would have been able to fight further 3330 enhancements because it is a technology they are familiar with, and they have an inventory of 3330-like devices that could have been retooled into machines of the Midas or Iceberg type.

It is not yet clear whether the Iceberg program — essentially a double-density 3330 — is still in the IBM game plan.

Analysis

However, it is clear that one of the problems facing IBM at this point — with the Winchester and Midas programs — is that the systems could be readily duplicated by the independent peripherals industry that has now gained experience with the 3330-equivalent disk drives.

All of the recently released secret IBM documents show the firm is conscious of the competition and is constantly urging its engineering departments to come up with new products that can easily be duplicated by the independents, therefore keeping the independents off balance and their markets relatively small.

The independents who hope to survive if IBM is successful in downplaying 3330s in favor of the Winchester concept will have to start working on the new devices now or convince computer users that their planned 3330-like enhancements are reasonable alternatives to the Winchester-type drives.



1400 PROGRAMS STILL PICKING YOUR POCKETS?

Save time, core and rent with INSCO/CS 1400 Translator. This unique proprietary system has already converted over 1000 programs from Object to COBOL. Typical results: 360/40 DOS with disk programs—35% time savings; 370/155 OS tape programs—3 times faster using 1/3 the core.

Besides these everyday savings, INSCO/CS Translator helps you get back the most on your original 1400 program investment. It rescues your programmers from the drudgery of second generation languages. And it eliminates costly patching, emulation and simulation forever.

Why postpone the inevitable? Send today for our free brochure "The Better Way" or call Bob Russo: 212-553-8544.

INSCO/CS Translator
1200 Avenue Street
Box 101
New York, N.Y. 10038

Send me "The Better Way".

Please it to me.

Name _____

Company _____

Address _____

City, State & Zip _____

INSCO/CS

NCR Sees More Internal Changes On Road to Systems Capability

By Marvin Smalheiser
CW West Coast Bureau

SAN DIEGO, Calif. — National Cash Register Co. (NCR) has successfully come through an important period of change and more change is in the offing to make it stronger and more profitable, according to William S. Anderson, NCR president.

Anderson told a recent users meeting that most of the major reorganization had been accomplished by NCR but more change is due in both organization, including marketing and support groups, and products.

He said NCR is pointed in the direction of building systems capability.

"In the future, it will be systems capability, orientation toward the customer's needs and new directions in support and services which will be decisive in the marketplace," Anderson said.

Anderson said despite a loss in 1972, NCR was in the black with record revenues in the first quarter of this year.

"We were able to report that incoming equipment orders for the first three

...a Sense of Unity'

SAN DIEGO, Calif. — For William Anderson, the most important accomplishment of his first year as president of NCR is creating a "sense of unity in the company...a sense of dedication to be in the computer business."

In the past, "we felt maybe we were, maybe we were not...but if we're not in the computer business we're out of business, period."

The major obstacle now, he said, is increasing profitability.

"Now that we have tightened our belt, we have to make more money."

months of this year were up 22% over the comparable period of last year," Anderson said.

He noted the increase was paced by the DP business. When all computer-related equipment and services are taken into account, he said, NCR is profitable in computers.

Regarding NCR and Control Data Corp., its partner in a joint venture, Anderson said: "We are also making encouraging progress toward achieving compatibility between future NCR systems and future CDC systems so that both partners can offer a full range of computing power."

NCR's development of the next generation of Century computers is on schedule, he said, but declined to disclose any features.

There will be further expansion of the new family of satellite computers, the

CPI Plans to Deliver \$100 Million in '73

EDINA, Minn. — The year-old Computer Peripherals, Inc., a joint venture of Control Data Corp. and NCR, expect to deliver over \$100 million worth of products to its customer firms during 1973, according to President Paul J. Bulver.

The firm was established to engineer and manufacture printers, tape drives and punched-card equipment for use with both CDC and NCR systems.

"Already both CDC and NCR have achieved significant savings in the form of lower-cost computer peripherals and in shared research and development costs," Bulver noted.

CPI's product line includes a 1,200 line/min printer and 150-, 300- and 600 line/min drum printers.

In the tape line, CPI produces single and dual-cassette tape transports. CPI also makes a high-speed card reader, a high-speed punch and a medium-speed reader/punch.

399 series, plus release of more data terminals and associated communications equipment, he said.

Software a Sure Spot

Anderson expressed some dissatisfaction with NCR's software effort despite an investment of "over \$25 million in Century software during the past three years."

He told of a new General and Applications Software Development Division, which he personally will monitor.

In the near future, he said, a number of important new packages will be announced.

Anderson, who took over the helm at NCR a year ago, said "virtually every aspect of NCR's operations" has been reshaped and organized.

But he added: "In the future I shall be announcing a similar reorganization of our marketing and support groups."

Industrial National Bank of Rhode Island has purchased a Financial Information and Control System from Management Science America, to automate financial reporting.

Pan American World Airways has ordered a communications system from Collin Radio Co. as part of its worldwide reservation system. The order includes a total C-8500 communications processor and program switching equipment.

The New York General Post Office has purchased an Advanced Optical Character Reader (AOCR) system from Recognition Equipment Inc., for use in postal letter-sorting applications.

Temple University has ordered a Student Scheduling System from Systems and Computer Technology Corp. to provide computer support during the pre-registration, final registration and scheduling process.

Hecht Co., a department store firm, has ordered an additional 290 NCR 280 ter-

Orders & Installations

inals and an NCR 725 in-store computer, to convert its stores to point-of-sale equipment.

The Commonwealth of Virginia has ordered a Qwik-Draft system from Aspen Systems Corp. for legislative bill drafting. The system uses CRT terminals on-line to a computer for text editing.

The State of Wisconsin's Internal Revenue Department has ordered an LC-720 key-to-disk system from Logic Corp.

Old Stone Bank of Warwick, R.I., has installed a second NCR Century 200 to monitor demand deposits, savings accounts and installment mortgage loans.

Wells Fargo Bank, San Francisco, has ordered a Trace check processing system from Recognition Equipment. The bank will use this system for positive item control and high-density microfilming in its check-processing operations.

Dow Chemical has purchased a Micro-Sum computer performance measurement system from Tesdata.

WE CROSSED AN WITH OUR INTELLIGENT GOT AN



Corporate Offices: Ann Arbor, Michigan 48104 (313) 974-0900. District Sales Offices: Atlanta (404) 262-2602, Boston (617) 889-7290, Chicago (312) 986-1833, Cleveland (216) 833-6625, Dallas (214) 521-6710, Detroit (313) 522-0080, Houston (713) 685-5224, Los Angeles (213) 640-0920, New York (212) 371-0050, Philadelphia (609) 655-1770, Pittsburgh (412) 922-3350, San Francisco (415) 349-6656, Washington (703) 525-7300. In Canada: Sycom International Ltd., Toronto (416) 429-0853. Service Centers in 76 cities.

Japan Market Share Falling

Liberalization Move Seen as Mixed Blessing for IBM

By Molly Upton
Of the CW Staff

TOKYO — The proposed liberalization policy permitting up to 100% of foreign capital investment of computer firms here (CWC, May 30) could have several effects on the DP race, according to *EDP Japan Report*, a publication of International Consulting Corp.

While largely benefiting several U.S. makers who will fall under the classification of foreign firms, the results would be mixed for IBM, which has the distinction of being a wholly owned subsidiary of a foreign company allowed to engage in production in the report said.

Plus for IBM

IBM will benefit since it will be freed from the controls of the Ministry of International Trade and Industry (Miti), which has limited the production of the 360 Series to two models, the 20 and the 40, and classified the 370 Series as prod-

ucts of a "foreign-capital enterprise" although manufactured in Japan (thus excluding IBM from the large government-controlled market).

On the negative side for IBM, however, the other U.S. makers are expected to escalate their Japanese sales efforts and to begin production in Japan, so IBM will "lose its biggest advantage in domestic production," which has so far been its exclusive privilege, the newsletter noted.

Miti is currently studying how to protect the domestic industry after the liberalization, and plans to take the following measures, according to *EDP Japan Report*:

- Readjustment of conditions and procedures for setting emergency tariffs and dumping duties, and a reexamination of the tariff system.
- Establishment of a "tariff investigator system" to guard against foreign firms "dumping" computers in Japan.
- Revision or enactment of a new antimonopoly law in order to keep IBM's market share within a reasonable percentage, "even if the firm should take no unnatural measures to attain monopoly."

IBM's Share Falling

Although IBM may have been the first and is now the largest foreign DP enterprise in Japan, its market share has been falling in the last five years, according to the newsletter.

IBM has the giant slice of the Japanese market pie, 30%, but its share in the Japanese market is the smallest of its share in major countries of the world, the newsletter said. IBM's market share has also tended to level off as market share declined.

Government regulation is cited as being largely responsible for the decline from about 34% in 1968.

System 370 is not recognized as a Japanese-made computer, as IBM-Japan is

more than 50% owned by foreign interests.

This precludes IBM products from being handled by Japan Electronic Computer Co., a joint rental firm formed by Japanese manufacturers.

Home Sweet Home

Additionally, domestic products enjoy various financing and tax benefits under Miti's policy of promoting the domestic industry, the newsletter pointed out.

IBM-Japan is currently excluded from the government and related organizations market, whose installed base at the end of September 1972 was valued at \$516 million.

The firm must export 50% of its products.

Miti also excluded IBM-Japan from producing the Model 30 in Japan, while levying 15% tariff on imported mainframes and 25% on peripheral terminal equipment. In April 1972, the rates were lowered to 13.5% and 22.5% respectively.

IBM-Japan must obtain prior authorization from Miti to sell products in Japan made by any of the affiliates of IBM-World Trade in other countries.

Contracts

Quotron Systems, Inc., Los Angeles, has received a \$4.4 million contract from Dun & Bradstreet, Inc. for its Model 801 communications equipment to be used as part of Dun & Bradstreet's Advanced Office System.

Daconics has received a contract valued at over \$1 million from the Department of Commerce for 59 additional mini-computer systems for use at National Weather Service stations.

CAE Electronics Ltd. of St. Laurent, Que., has been awarded a contract by Canaton Mon-Max, valued at more than \$400,000, to provide the DP system for the heavy water plant at Glace Bay, Nova Scotia.

Logicon, Inc. is developing a preliminary software design for an advanced ballistic missile recovery system under a \$643,000 contract from the Air Force Space and Missile Systems Organization in Los Angeles.

Pulaski Savings and Loan Association and Quincy-Peoples Savings and Loan Association have contracted for on-line savings and mortgage accounting services from Financial Data Systems, Inc., St. Louis city center.

Kenne Associates, Inc. has received a contract worth over \$300,000 from Northeast Utilities, Inc. of Berlin, Conn., for development of a computer-based financial and accounting system.

Digi-Log Systems, Inc. has received a \$48,000 contract from Xonics, Inc. of Van Nuys, Calif., for 20 custom-designed terminals.

Informatics, Inc. Western Division has been awarded a \$133,000 software contract for data acquisition and recording at NASA's wind tunnel test facilities at Ames Research Center.

The Naval Electronics Laboratory Center in San Diego has awarded Control Data's Professional Services Division a contract valued at \$281,000 for systems engineering and documentation services.

Computer Corp. of America, Cambridge, Mass., has received a contract from the Department of Defense for its Model 204 on-line data base management software system.

Computer Sciences Corp. has received a \$1.2 million Navy contract to develop programs for a tactical support center aboard aircraft carriers.

ON-LINE TERMINAL OFF-LINE TERMINAL AND INTELLIGENT "3270."

INTRODUCING THE SYCOR 250.

It's our new intelligent on-line terminal that's lower priced than IBM's 3270 and compatible in both hardware and software.

In fact, you can just plug it into any IBM network and let it go to work.

But, unlike the 3270, our Sycor® 250 has many of the intelligent features that have made our Model 340 remote batch terminal so popular.

Features that let the 250 check branch office key entry field-by-field instantly, providing clean



data to the computer and significantly improving operator efficiency. What goes into the computer goes in clean (at up to 4800 baud).

— and you spend less time on the line. So, you can install more terminals per line, and probably end up needing fewer lines and ports.

NEW DUAL TRACTOR PRINTER

The 250 has some pretty impressive optional equipment, too. It's available with a badge reader, a light pen and a family of versatile printers.

The printers are our new 2580 series, with 40, 80 or 165 cps speeds. They feature dual tractors that handle two independent continuous forms simultaneously. So now you can combine your forms printing and administrative message traffic on one printer.

HOOK A SYCOR 250 INTO YOUR 3270 NETWORK

See what our 250's intelligence can do for you. We think it's the best in the industry.

And we're the people who invented intelligent terminals in the first place.

SYCOR

See the Sycor 250 at the National Computer Conference. We'll be in booth 2601.



We make a very durable Teleprinter.

For 10 years Di-An has built tough printers for the most demanding military and OEM applications. That's why people who know us have already ordered thousands of our 9000 Teleprinters. Distributions such as TTS Systems of Los Angeles, Computer Marketing and Supply of Chicago, and the Electronic Association of Denver, have been testing terminals and therefore must evaluate them thoroughly before they buy. They bought Di-An's 9000 because it is measured up to their standards. It'll work for you too.

Why? Just three simple moving assemblies and advanced integrated circuitry have replaced the complicated moving parts of the old mechanical printers. You get improved reliability and lower maintenance costs. Add these tough-to-beat features: selectorable 110, 150 or 300 baud transmission; half and full duplex or local operation; upper and lower case print; odd, even or no parity; form-feed fractions that adjust from one to 16 inches and 1/2 inch; all-part copy; vertical tabulation.

Sales & Service Nationwide

DI-AN CONTROLS, INC.

944 Dorchester Avenue
Boston, Massachusetts 02125.

NCC Booth #1338

→THROUGHPUT←

ARE YOU GETTING ALL YOU DESERVE?

THESE PRODUCTS FROM BOOTHE MANAGEMENT SYSTEMS CAN HELP YOU ANSWER THIS QUESTION
WITH A POSITIVE
"YES"

SPOOLER

SPOOLER provides an economic printer output spooling routine for DOS. The program allows the printing of output to be independent of the generation of the output. The function of the program by the SPOOLER is to write the output onto disk as it is being generated, then read the output from the printer as the printer becomes free — performing all of its functions in a partition as small as 4K.

BCCXREF

BCCXREF will reduce by over 50% CPU usage for the generation of the CROSS-REFERENCED listing provided by IBM COBOL. **BCCXREF** will significantly reduce storage requirements in the computer partition or region, increase throughput, and allow greater system usage for other purposes.

DOSRELO

DOSRELO provides a method of making DOS problem programs self-contained. DOSRELO accomodates the self-relocation capability for all programs, regardless of the language, by adding the relocation logic to the object code of the program before the Linkage Editor creates it on the Core Image Library.

CIMS

The Computer Installation Management System (CIMS) provides a method to supply management with pertinent information on the utilization of their data processing hardware. CIMS accepts data collected by the System Management Facility (SMF), formats the data and presents the data in varying sequences and formats. Reports for job accounting, multi-programming, throughput, hardware analysis, and others are provided.

GET ALL YOU DESERVE!

write or call

BOOTHE MANAGEMENT SYSTEMS

A DIVISION OF BOOTHE COMPUTER CORPORATION
135 West 50th Street • New York, NY 10020 • Tel. 212/449-8710
555 California St. • San Francisco, CA 94104 • Tel. 415/988-6580

Immediately available for
your free trial use with
no obligation, of course.

Accepted by Banks,
Business, Oil, University,
Accounting, and
many other firms

[IBM] use some of our patents. Then it becomes some sort of standard. If we said no to them they might have figured out another way of doing it.

"Obviously, some patents are more valuable than others. And they paid us a substantial fee, so we felt there was one in there that they really wanted, and we know which one it was."

Use Not Foreseen

But May admitted "it was only when they introduced the 6,250 [bit/in.] system that we realized that these units, did it say that patent was one of a number of patents licensed to IBM" by Potter in 1971. IBM paid a fixed price of about \$3.7 million for the patents, according to George W. May, president of Potter.

The patent was issued in the name of John T. Potter, in 1965.

'Of No Concern'

IBM said: "The coverage of Potter's patent No. 3,226,685 has not been determined by IBM and is of no concern since we are licensed on a fully paid-up basis."

May explained that Potter "was anxious to have them

of that phrase up to the Board of Equalization, which Wema applied to our participation in the California battle over taxation of software.

The group has proposed an amendment that would narrow the definition of taxable software and has established full-time representation in Sacramento to lobby for its amendment.

California bill AB 69, introduced by Assemblyman Joseph Gonzales, seeks to extend permanently the two-year moratorium on taxation of all software except "basic operational programs."

This bill leaves the definition

Cutbacks Affect Exchanges' Unit

NEW YORK — Low volume of securities trading has caused a cutback in personnel and a delay in projects at the Securities Industry Automation Corp. (Siac), the computer subsidiary jointly operated by the American Stock Exchange and the New York Stock Exchange.

Siac performs DP work for the two exchanges, and much of its business is related to trading volume.

A total of 61 persons, or about 65% of the staff, have received notices during May.

The latest round of cuts involves managerial and professional people, according to a spokesman, whereas the first layoffs were mainly technical personnel.

In addition to the layoffs, the program to expand computerized execution of odd-lot orders is expected to be delayed. In the first quarter, Siac spent \$1.3 million more than it received. Revenues stem from such items as charges for the exchanges' stock-ticker services.

Singer Forms Support Unit

NEW YORK — Singer Business Machines has formed a new marketing support organization to consolidate all functions related to the sale, installation, maintenance and software support of its products.

POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS POSITION ANNOUNCEMENTS



The time when everything was extraordinary...

The joy of discovering what made things go — and what made them stop. Why some objects floated, and others sank. What happened when you heated them, or cooled them. Your desire to have things work, and the desire to make them work better, has not diminished. This inquisitiveness, this desire to analyze, synthesize, perfect, motivates the people at **HEWLETT-PACKARD**.

Hewlett-Packard is one of the world's leading designers and manufacturers of electronic, medical, analytical, and computing instruments and systems. From its founding in 1939, Hewlett-Packard has

consistently followed its basic philosophy of offering only products representing significant technological advancements. This demanding criterion has been met over and over again in the more than 2,000 products that we have marketed.

To maintain its leadership, Hewlett-Packard invests heavily in new product development. Research and development expenditures represent a high percentage of our sales revenue, providing our sales engineers with innovative products that have a clear competitive edge.

Hewlett-Packard's continuous growth has created career opportunities in the following states:
MASSACHUSETTS, NEW YORK & WASHINGTON, D.C. METROPOLITAN AREAS

CALCULATOR

SALES ENGINEERS

If you have a sales background in programmable calculators or related computing products, the technically advanced line of Hewlett-Packard, a leader in the systems approach to calculators, offers you the opportunity to find the kind of work you've been seeking. At HP you have more to sell. The 8000 series non-programmable and programmable calculators offer the widest range of operating features in the field; a calculator to fit every requirement — from superdetailed and software engineering packages like the 8000 to our new selling opportunities. This amazing shirt pocket calculator has 40 specific built-in capabilities that enable it to perform more than 100 different financial calculations involving a relationship between time and money. You will need a college degree in the field and a technical or business degree with a basic computer programming background.

APPLICATIONS ANALYST

Developing new markets in the business sector for programmable calculators. Knowledge of marketing, programming (Basic) a must. Degree in business administration or computer science required with 3 to 5 years experience.

DATA CENTER

DATA BASE MANAGEMENT SPECIALISTS

Provides technical sales support for new data base software. Requires data base management techniques, structures, and applications experience with 2 or more years of COBOL.

DATA ACQUISITION SPECIALIST

To provide technical support for our Data Acquisition Systems. Requires knowledge in instrumentation, front end

I/O, and software programming for mini-computers, BASIC, FORTRAN, and ASSEMBLY languages required.

TIME SHARE APPLICATIONS SPECIALIST

To provide technical sales support for our mini-computer program such as computer aided instruction, File Management, Text Editing, etc. Two or more years experience in BASIC on time share required with some FORTRAN.

MINI COMPUTER SYSTEMS SPECIALIST

To provide technical sales support for our mini-computer systems. Requires experience with time share, real time or disc operating system interface. ASSEMBLY language required.

EDUCATION SPECIALIST

Responsibilities include instructing internal software courses in computers, related devices and applications; that insure equipment, facilities and materials are available and operable. Aide in planning and developing of regular and special training courses. A broad knowledge of a large scale general purpose multi-programmable computer system and its applications. FORTRAN, ALGOL or COBOL language with comparable experience in assembly language necessary. Degree in Mathematics or a Science is desirable.

DATA SYSTEMS

SALES ENGINEERS

EDUCATIONAL SALES

Responsible for sales of total computer and calculator products to educational institutions. Requires a BS degree, knowledge of minicomputers and sales experience in the educational market place.

OEM SALES

Responsible for sales of HP's total product line of minicomputers, tape and disc drive to OEM customers. Requires a BS degree and experience selling minicomputers and/or peripherals in the OEM Marketplace.

SYSTEMS ANALYSTS

Provide technical support for data systems sales force, including: pre-sales proposals, presentations, development of sales materials, implementation, and post-sale support of customers. Requires a scientific degree and broad experience with minicomputers in some or all of the following market places: Commercial, educational, scientific and communication. A knowledge of computers at the assembly language or operating systems level is a must.

ELECTRONIC SYSTEMS

FOURIER/LASER SALES ENGINEER

Sales responsibility for our Fourier Analyzer and laser interleave-mirror systems. Requires a BSEE, BSME, and 2-3 years experience in digital signal analysis, vibrations, and acoustical processing areas.

STAFF ENGINEER

Act as backup to Sales Engineer. Requires BSEE degree and 2-3 years experience in computer test field. Position eventually leads to sales.

If you like the challenge of defining customers problems and meeting their technical needs, the "Problem-Solvers" at HP welcome you. We compliment our employees with an excellent salary, progressive benefits package, coupled with a chance to grow.

HEWLETT  **PACKARD**

"An Affirmative Action Employer"

Interested? Call Monday through Thursday, June 4 to 7, 10 a.m. to 4 p.m.

Mr. Joseph Heimbold, (212) 524-5306

or send resume in confidence to:

HEWLETT-PACKARD

West 120 Century Road, Paramus, New Jersey 07652

OUR PRODUCTS ARE ON EXHIBITION AT THE NCC EXPOSITION, BOOTHES 2515 and 2615

| POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS | POSITION ANNOUNCEMENTS |
|---|---|------------------------|------------------------|--|
| <p>APPLICATIONS PROGRAMMER to work with students and faculty. Knowledge of FORTRAN and additional languages required, research background desirable.</p> <p>OPERATING SYSTEMS PROGRAMMER to maintain home-written and DOS systems. Also, to evaluate new computer hardware and software systems.</p> <p>Liberal fringe benefits, teaching opportunities, B.A. degree helpful. Send resume within two weeks to:</p> <p>George Geroline Computing Center Ohio State University Columbus, Ohio 43274 An Equal Opportunity Employer</p> | <p>OPPORTUNITIES FOR YOU</p> <p>PRODUCT MARKETING MANAGER — Process Control and Instrumentation Computer, West Coast, \$25,000.</p> <p>SALES REPRESENTATIVE — Micro-computer systems, \$24,000.</p> <p>SALES REPRESENTATIVE — Mainframe logic systems, \$18,000.</p> <p>SYSTEMS ENGINEER — Communications processors, Interfaces. Software and hardware, \$16,000.</p> <p>FIELD SERVICE ENGINEERS — Mainframe and/or peripherals experience, New York, New Jersey, Philadelphia, Atlanta, Dallas, Chicago, Los Angeles, San Francisco, others \$14,000.</p> <p>Call or write now to discuss these and many other situations of interest. NCC</p> <p>Call or write New York Mr. Michael Brum BRUM ASSOCIATES, INC. 348 North Broadway Jericho, N.Y. 11753 (516) 622-7940</p> | | | <p>Challenge! Growth! Opportunity!</p> <p>The Auerbach Corporations, an international leader in data systems technology has many interesting and diversified positions available.</p> <p>AUERBACH ASSOCIATES INC.</p> <ul style="list-style-type: none"> • Commercial EDP Consultants • System Programmers • Software Development Specialists • Communications Software Engineers • Business Programmers <p>AUERBACH PUBLISHERS INC.</p> <ul style="list-style-type: none"> • EDP Report Editors • Copywriters • Editorial Assistants • Project Editors • Associate Editors • Sales Representatives <p>The career opportunities available in our Philadelphia, New York City, Washington, D.C. and Cherry Hill, New Jersey facilities in a professionally stimulating environment and grow with the industry. To obtain additional information about career opportunities with the Auerbach Corporations, send your resume in complete confidence to Mr. Neal A. Block, Personnel Manager</p> <p>AUERBACH CORPORATIONS 121 N. Broad Street Philadelphia, Pa. 19107 An Equal Opportunity Employer M/F</p> |

Interview this week for an uncommon opportunity with SPERRY UNIVAC during the NCC!

Call TODAY through Thursday for an immediate New York interview.

Call thru Thursday, 10:00 a.m.-8:00 p.m.

CALL 212-581-3317 Ask for Charlie Sigg or Gerry Goerlitz
(Out-of-Towners call collect.)

SALES REPRESENTATIVES: Experienced in selling computer hardware, from peripherals to large-scale gear. Must have solid track record. Future potential to move into management. Position with Americas Division and Communications and Terminals Division throughout U.S.

ELECTRICAL ENGINEERS with experience in any of the following: Logic Design, Systems Design employing Micro-Programming Techniques, CPU Mainframes, Mass Storage Controllers, Sonar/Radar Systems, Signal Processing, Servo and Servo Systems, MSI andSSI Circuit Technology, Magnetic Recording, Mass Storage, Positions available throughout the U.S.

RESEARCH & DEVELOPMENT: Scientists to work on the development of Optical Memories, Advanced Degrees and experience in deposition of magnetic films or optical system design. Also openings in mass storage development.

PROGRAMMERS: Systems Programming for Compiler Development familiar with PL/I, Algol, Jovial and Cobol, Development or Maintenance of Supervisor, Executive Routines, Emulation, Data Base Management Systems, Software Performance Monitoring, PIOS Handlers or System Monitors. Also design of Multi-processing, Remote access operating systems and Language Processor Development or Maintenance.

LANGUAGE DEVELOPMENT: Opportunities in Compilers and Translators — language processor development, testing and support. Qualifications include Assembly Language Programming and some Systems Programming. A minimum of two years experience is required. Additional valuable background would be compiler experience on COBOL and FORTRAN Systems. Positions available at Cineminsion, N.J.

SYSTEMS DESIGNERS: Experience of 2-5 years in designing interfaces between peripherals and large-scale digital systems. EE degree preferred. Positions with Communications and Terminals Division in Salt Lake City.

PROGRAMMER/ANALYSTS: Desire real-time, scientific, military or commercial applications experience. Large-scale, project oriented positions available which require capability in a variety of programming languages. A knowledge of a compiler language is desirable. Scientific degree preferred.

If you are unable to call, send your resume to: G. C. Goerlitz, Manager, Headquarters Employment, C-1, Sperry Univac, P.O. Box 500, Blue Bell, Pa. 19422.

SPERRY UNIVAC
An Equal Opportunity Employer M/F

Challenge! Growth! Opportunity!

The Auerbach Corporations, an international leader in data systems technology has many interesting and diversified positions available.

AUERBACH ASSOCIATES INC.

- Commercial EDP Consultants • System Programmers
- Software Development Specialists • Communications Software Engineers • Business Programmers

AUERBACH PUBLISHERS INC.

- EDP Report Editors • Copywriters • Editorial Assistants • Project Editors • Associate Editors
- Sales Representatives

AUERBACH CORPORATIONS

The career opportunities available in our Philadelphia, New York City, Washington, D.C. and Cherry Hill, New Jersey facilities in a professionally stimulating environment and grow with the industry. To obtain additional information about career opportunities with the Auerbach Corporations, send your resume in complete confidence to Mr. Neal A. Block, Personnel Manager

AUERBACH CORPORATIONS
121 N. Broad Street
Philadelphia, Pa. 19107
An Equal Opportunity Employer M/F

PROGRAMMER/ANALYSTS

Experienced Communication oriented programmers who have designed, coded and implemented message switching/inquiry-response/ front-end systems. Candidates must have 3 years assembly language experience utilizing a communications oriented operating system.

Experienced mini-computer programmer who has designed, coded and implemented AT&T, Western Union and BSC data communication handles/drivers. Candidates must have 3 years assembly language experience utilizing a communication oriented operating system.

Send resume in confidence to:



COLLINS RADIO COMPANY
Dallas, Texas 75207

an equal opportunity employer m/f

ENGINEERS, PROGRAMMERS Opportunities in San Diego

System Logic Design

Openings in two areas of activity:
Design cooperation of micro-programmable processors; unit system-level design, design, development, evaluation of engineering models. BSEE required plus computer science courses and 5 years experience in CPU logic design and testing.

Logic design of peripheral controller, using state-of-the-art components, including TTL, MSI, ECL and ROM; supervision of prototype construction, test, documentation. BSEE required, with 4 years logic design experience.

Hardware Diagnostic Engineering

Creative use of existing computer logic to isolate faults to board or component in automatic diagnosis of malfunctions in CPU's, peripherals, and other electronic components. Writing of diagnostic programs, debugging existing programs. Degree required in computer science, math or EE, plus 5 years' applicable experience and familiarity with hardware and software.

Software Development Programmers

Design and implementation of compilers for languages such as COBOL, FORTRAN, PL/I data base, ALGOL and software implementation language. Two or more years' compiler design and implementation experience required. BS in physical sciences or computer science desirable.

Arrange for NY interview at NCC

For an interview at the New York Hilton during the National Computer Conference, call George Rice at (212) 765-6187 June 3-6.
Or send resume to Professional Placement Office at:

NCR

DATA PROCESSING DIVISION

16575 W. Bernardo Dr., San Diego, Calif. 92127
An equal opportunity employer

? FRUSTRATED

TRYING TO FIND GOOD COMPUTER
LITERATURE ...
AND THE TIME TO READ IT?



Hire full-time research
for just \$4.25 a month!
Here's what you get:

Abstracts
Digests
Resources
News Items
Calendar
Reviews
Original Reports
Yearly Index

Published Each Month

Since 1955

Write for Information

Data Processing Digest

1600 LA TUNA BOULEVARD, LOS ANGELES, CALIFORNIA 90045



PLUS OUR WELL KNOWN LINES
OF FULLY RECONDITIONED AND
GUARANTEED EQUIPMENT

For prompt attention
to your EDP
requirement, call

AC214/252-7502



vardon
& associates. Inc.

1320 N. Bellmead Suite 102 • Irving, Texas 75062 • 214 233-7802

Sales Off to End Users

STC Earnings, Revenues Rise in Quarter

LOUISVILLE, Colo. — Earnings and revenues were on the rise during the first quarter at Storage Technology Corp., despite the slackened pace of sales to end users compared with the previous two quarters.

In the period ended March 30, earnings rose to \$1.7 million or 49 cents a share, including a \$645,000 special credit, compared with \$207,000 or 7 cents a share, including a \$98,000 special credit, in the comparable 1972 period.

Revenues rose to \$11.3 million from \$3.7 million in the same year-ago period. Of this amount, \$7.9 million was obtained from sales and \$3.4 million from

rental and service income.

As of April 30, annual revenue had increased to \$15.2 million from \$6.2 million a year earlier, the firm said.

Profitability, a spokesman noted, continues to remain heavily dependent upon the sale of equipment to end users and companies and leasing companies.

End-user sales were below those of the past two quarters which the firm attributed to the "adverse effects of a rumored announcement by IBM of a new line of high-density tape equipment." After IBM and STC announced their products, "orders and shipments increased significantly," the spokesman said.

can't," the spokesman said. Of the \$7.9 million revenues from sales, \$7.5 million represented sales to leasing companies.

Nickels & Dimes

Although Xerox expects 1973 profits to match its 17% increase in 1972 earnings, President Archie R. McCardell told shareholders the cost of introducing new products would make it difficult for the second half of 1973 to equal the "excellent financial results" expected for the first half.

Xerox directors voted an increase in the quarterly dividend to 22 cents a share from 21 cents payable July 2 to holders of record June 8.

\$\$

Adverse market conditions: Advanced Memory Systems has withdrawn its registration statement for 150,000 shares by stockholders. Since the firm postponed its public offering of 715,000 shares of common.

\$\$

Electronic Computer Programming Institute's annual meeting was postponed because of negotiations through which the chairman and vice-chairman of the board might transfer control of the company through sale of their stock.

\$\$

Tri-Data's profitability in 1972 was attributed largely to the "increasing acceptance" of new models of Carttible digital cartridge systems. The firm has procured a new \$500,000 unsecured line of credit from Union Bank of Palo Alto.

\$\$

Hewlett - Packard Earnings Rise 70% On 40% Increase in 2d Quarter Sales

PALO ALTO, Calif. — Hewlett-Packard Co. reported a 40% increase in sales and a 70% increase in earnings for the second quarter ended April 30.

Revenues for the quarter totalled \$163 million, compared with \$116.6 million for the corresponding 1972 quarter.

Earnings amounted to \$14.6 million or 54 cents a share compared with earnings of \$8.6 million or 33 cents a share in the year-ago period.

Itel Posts Turnaround
in First Quarter

SAN FRANCISCO — Itel Corp. posted a turnaround in its first quarter report for the period ended March 31.

Earnings, including a \$254,000 tax credit, totalled \$721,000 or 17 cents a share compared with a loss of \$1.5 million or 21 cents a share in the year-ago period.

Revenues rose to \$33.3 million from \$19.4 million.

Incoming orders for the quarter rose 37% to \$175.4 million compared with \$127.9 million in the same period of 1972.

For the six months, orders totaled \$331.5 million up 39%.

Revenues for the six months totalled \$290.6 million, a 36% increase over the first half of 1972.

Earnings rose 53% to \$23.3 million or 87 cents a share compared with \$15.2 million or 58 cents a share, during last year's first half.

Virtually all of HP's operating divisions are reporting a higher level of business in 1973, President David Packard said.

"International markets have been particularly strong," he noted. "With orders from international customers amounting to \$139.2 million for the six-month period.

"This represents a gain of 46% over the corresponding period of 1972."

**We help
Fruehauf Corp. make
a fast buck.**



action
IMMUNICATION SYSTEMS, INC.



Computerworld

Stock Trading Summary

CLOSING PRICES THURSDAY, MAY 31, 1973

COMPUTERWORLD

 All statistics
 compiled, computed
 and formulated by
 TRADEQUOTES, INC.
 Cambridge, Mass. 02138

Earnings Reports

CAMBRIDGE MEMORIES
Three Months Ended Feb. 28
 Shtr Endr 1,111 6,08
 Revenue 2,769,746 872,183
 Spec Cred 1,000 1,000
 Earnings 140,078 75,639
 6 Mo Shtr .20 .05
 Tax Cred 62,880 22,871
 Earnings 258,488 47,857
COMPUTER EQUIPMENT
Three Months Ended March 31
 Shtr Endr 1873 1972
 8,09 6,08
 Revenue 6,386,000 5,028,000
 Spec Cred 361 (35,749)
 Earnings 211,000 188,000
COMPUTER SCIENCES
Year Ended March 30
 1873 1972
 8,03 (000)
 Revenue 12,000 *\$107,488
 Spec Cred 100 ..
 Earnings 361 (35,749)
e-Excludes revenues of a subsidiary
from the sale of a subsidiary's
interest in Computax Services, Inc.
c-From sale of a subsidiary.INFINET
Three Months Ended March 30
 1873 1972
 Shtr Endr 8,22 6,22
 Revenue 7,533,000 *\$4,255,000
 Tax Cred 339,000 ..
 Earnings 63,000 (19,000)
COMDYN
Three Months Ended March 31
 1873 1972
 Shtr Endr 6,02 8,02
 Revenue 6,284,425 5,891,223
 Tax Cred 141,561 60,000
 Earnings 12,000 25,000
 Revenue 13,503,000 11,406,473
 Tax Cred 300,000 100,000
 Earnings 329,075 259,011
COMFON
Three Months Ended March 31
 1873 1972
 Shtr Endr 9,16 6,04
 Revenue 41,923,000 34,465,000
 Earnings 589,000 156,000
MEMOREX
Three Months Ended March 31
 1873 1972
 Shtr Endr 9,16 6,03
 Revenue 11,503,000 11,406,473
 Earnings 60,842 56,624
ALGOREX DATA
Nine Months Ended March 31
 1873 1972
 Revenue \$1,124,911 \$718,428
 Loss 15,406 137,902
NUCLEAR DATA
Year Ended Feb. 28
 1873 1972
 Revenue \$1,124,911 \$718,428
 Loss 4,109,602 3,495,590
POTTER INSTRUMENTS
Three Months Ended March 31
 1873 1972
 Revenue \$610,8269 \$6,500,909
 Loss 1,000 1,000

b-Rev. b35,199,474 24,178,044

Loss 420,767 2,709,053

a-Netted, b-Includes royalty income.

 THE
 AMERICAN
 COMPUTER
 EXCHANGE
 INC.
ANNOUNCES A NEW
CONCEPT IN
COMPUTER MARKETING

An EDP EQUIPMENT EXCHANGE

 on which your company lists
 its equipment, Buy-Sell-Lease
 Sales, Leasing, and
 Benefits! Our outlet for:

- National and International Listings
- Broker/Dealer Listings
- Financial Listings
- Assistance in Sales/Purchase
- Installation Arranged
- Assistance in Leasing
- Finance Packages

 Payment of equipment gains
 remitted from buyer to seller
 until:

 • No charge for subscription
 or "Buy-Sell" listings.
 • \$25.00 per listing.
 • 1% Service Charge paid by seller

 Information:
 Call 415/925-3884-3881
 or write to: ACX
 24500 Chagrin
 Beachwood, Ohio 44122

| EXCH | PRICE | | | | | | EXCH | PRICE | | | | | |
|-------------------------|-------|--------|--------|-------|-------|-------|-------------------------|---------|---------|---------|-------|--------|-----|
| | 1973 | CLOSE | WEEK | WEEK | 1973 | CLOSE | | 1973 | CLOSE | WEEK | WEEK | 1973 | PCT |
| | RANGE | MAY 31 | NET | PCT | | RANGE | MAY 31 | NET | PCT | | RANGE | MAY 31 | PCT |
| EXCH | | | | | | | | | | | | | |
| EXCH | | | | | | | | | | | | | |
| SOFTWARE & EDP SERVICES | | | | | | | | | | | | | |
| 0 ADVANCED COMP TECH | | 1- 2 | 1 | - 1/8 | -11.1 | 0 | 3N COMPANY | 70- 89 | 82 3/8 | - 2/2 | -2.8 | 0 | 0 |
| 0 APPLIED DATA MHS. | | 2- 4 | 2 1/4 | - 1/4 | +12.5 | 0 | NOORE CORP LTD | 53- 68 | 62 3/4 | - 2/2 | -2.4 | 0 | 0 |
| 0 AUTOMATIC DATA PHOC | | 56- 94 | 56 3/8 | - 10 | -15.1 | 0 | NASHUA CORP | 42- 58 | 47 1/2 | - 1 1/2 | +2.6 | 0 | 0 |
| 0 BRANDON APPLIED SYST | | 1- 1 | 5 1/8 | 0 | 0.0 | 0 | NOVACORP REYNOLD | 16- 24 | 16 1/2 | 0 | +2.0 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 3 1/4 | - 1/4 | +12.5 | 0 | NOVACORP REGISTRE | 12- 23 | 11 1/2 | 0 | +21.0 | 0 | 0 |
| 0 COMPUTER DYNAMICS | | 1- 2 | 5 1/8 | 0 | 0.0 | 0 | NOVA TAC PRODUCTS CO | 15- 26 | 16 7/8 | - 1/8 | -0.6 | 0 | 0 |
| 0 COMPUTER NETWORK | | 1- 5 | 1 1/2 | + 1/8 | +20.0 | 0 | NOVA TAC SYSTEMS | 17- 23 | 18 1/8 | + 7/8 | +5.8 | 0 | 0 |
| 0 COMPUTER SCIENCES | | 2- 6 | 2 5/8 | + 1/8 | +5.0 | 0 | N HARRINGTON CORP | 211-245 | 221 3/8 | - 6 5/8 | -2.9 | 0 | 0 |
| 0 COMPUTER TASK GROUP | | 1- 2 | 1 1/2 | 0 | 0.0 | 0 | N HARRIS HADIO | 18- 26 | 19 1/4 | + 3/8 | -1.9 | 0 | 0 |
| 0 COMPUTER TECHNOLOGY | | 1- 3 | 1 1/4 | - 1/4 | +12.5 | 0 | N CONTROL DATA CORP | 36- 62 | 36 1/4 | - 3/4 | -11.8 | 0 | 0 |
| 0 COMPUTER USEAGE | | 1- 3 | 4 5/8 | + 1/4 | +5.7 | 0 | N CROWN COMPUTER CORP | 28- 50 | 31 1/4 | - 1/4 | -1.6 | 0 | 0 |
| 0 COMRESS | | 1- 2 | 1 1/8 | 0 | 0.0 | 0 | N DIGITAL COMP CONTROL | 2- 6 | 2 3/8 | + 1/8 | +5.5 | 0 | 0 |
| 0 COMSHARE | | 1- 4 | 4 3/4 | + 1/4 | +35.5 | 0 | N DIGITAL EQUIPMENT | 73-105 | 84 1/8 | - 1 3/4 | -1.6 | 0 | 0 |
| 0 CORPORATE COMPUTER | | 1- 5 | 1 1/2 | + 1/8 | +20.0 | 0 | N ELECTRONIC ASSOC. | 4- 9 | 5 1/8 | + 3/8 | -7.0 | 0 | 0 |
| 0 CURVORA CURP | | 6-15 | 15 7/8 | - 7/8 | -8.6 | 0 | N ELECTRONIC ENGINEERS | 4- 11 | 6 1/4 | 0 | 0.0 | 0 | 0 |
| 0 DATA COMMUNICATIONS | | 1- 3 | 1 1/4 | - 1/4 | +12.5 | 0 | N ELECTRONIC INSTRUMENT | 22- 28 | 24 1/2 | - 1/2 | -1.6 | 0 | 0 |
| 0 DATA RESOURCES | | 1- 3 | 6 1/8 | 0 | 0.0 | 0 | N GENERAL AUTOMATION | 26- 35 | 29 1/4 | - 2 1/4 | -7.1 | 0 | 0 |
| 0 ELECTR CORP PROG | | 1- 2 | 1 1/2 | - 1/4 | +12.5 | 0 | N GRI COMPUTER CORP | 1- 3 | 1 | 0 | 0.0 | 0 | 0 |
| 0 ELECTRONIC DATA SYS. | | 35-60 | 37 1/8 | - 1/4 | +2.0 | 0 | N HARRIS COMMUNICATIONS | 70- 75 | 73 1/4 | - 1/4 | -1.6 | 0 | 0 |
| 0 INFORMATION | | 1- 2 | 3 1/4 | - 1/4 | +12.5 | 0 | N HONEYWELL INC | 161-199 | 179 1/4 | + 1/8 | +0.1 | 0 | 0 |
| 0 I-O-MATIC DATA | | 1- 1 | 5 1/8 | - 1/4 | +16.6 | 0 | N IBM | 315-457 | 314 3/4 | - 8/4 | -21.4 | 0 | 0 |
| 0 KEYANE ASSOCIATES | | 3- 4 | 3 | 0 | 0.0 | 0 | N INSTRUMENTATION | 18- 20 | 19 1/4 | + 1/4 | +0.0 | 0 | 0 |
| 0 KEYDATA CORP | | 7-12 | 6 5/8 | + 1/8 | +1.9 | 0 | N INTERDATA INC | 7- 13 | 8 1/4 | + 1/8 | +16.4 | 0 | 0 |
| 0 LOGICON | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N INSTRUMENTATION | 2- 19 | 4 1/2 | + 1/2 | -11.1 | 0 | 0 |
| 0 MANAGEMENT DATA | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N INSTRUMENTATION | 23- 29 | 32 3/8 | + 2/8 | +2.9 | 0 | 0 |
| 0 NATIONAL CSS INC | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N INSTRUMENTATION | 1- 3 | 1 1/4 | + 1/2 | +0.0 | 0 | 0 |
| 0 NATIONAL INFO SRVCS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N INSTRUMENTATION | 1- 3 | 1 1/4 | + 1/2 | +0.0 | 0 | 0 |
| 0 LINE SYSTEMS INC | | 13-17 | 13 1/2 | 0 | 0.0 | 0 | N INSTRUMENTATION | 3- 6 | 3 3/4 | + 1/8 | +12.5 | 0 | 0 |
| 0 PROGRAMMING LANGUAGE | | 2- 3 | 2 5/8 | + 1/8 | +5.0 | 0 | N INSTRUMENTATION | 1- 2 | 1 1/8 | + 1/8 | +12.5 | 0 | 0 |
| 0 PROGRAMMING & SYNS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N INSTRUMENTATION | 5- 9 | 5 5/8 | + 1/4 | +1.6 | 0 | 0 |
| 0 RAPIDATA INC | | 6-21 | 7 1/8 | 0 | 0.0 | 0 | N INSTRUMENTATION | 1- 2 | 1 1/8 | + 1/8 | +1.6 | 0 | 0 |
| 0 RAYDOME COMPUTER | | 6-21 | 5 1/2 | - 1/2 | -19.3 | 0 | N INSTRUMENTATION | 14-26 | 15 1/4 | - 5/8 | -5.0 | 0 | 0 |
| 0 SIMPLICITY COMPUTER | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N INSTRUMENTATION | 14-169 | 169 5/8 | - 5/8 | -3.8 | 0 | 0 |
| 0 TBS COMPUTER CENTERS | | 3- 4 | 2 3/4 | 0 | 0.0 | 0 | N INSTRUMENTATION | 1- 2 | 1 1/8 | + 1/8 | +12.5 | 0 | 0 |
| 0 TCC INC | | 1- 1 | 3/8 | 0 | 0.0 | 0 | N INSTRUMENTATION | 5- 9 | 5 5/8 | + 1/4 | +1.6 | 0 | 0 |
| 0 TYNNWARE INC | | 6-12 | 7 | + 1/8 | +16.6 | 0 | N INSTRUMENTATION | 9- 16 | 9 1/4 | + 1/4 | +2.7 | 0 | 0 |
| 0 UNIVERSITY COMPUTER | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 2- 8 | 3 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 UNIVERSITRONICS | | 1- 12 | 12 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 2 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 UNIVERSITRONICS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 UNIVERSITRONICS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 UNIVERSITRONICS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER EQUIPMENT | | 2- 3 | 2 1/4 | + 1/8 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER MACHINERY | | 7- 13 | 6 3/4 | 0 | 0.0 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER RECEIVER | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 9- 16 | 11 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | 0 | 0 |
| 0 COMPUTER SYSTEMS | | 1- 2 | 1 1/4 | - 1/4 | +12.5 | 0 | N LEASO CORP | 1- 3 | 1 1/4 | + 1/4 | +12.5 | | |

Hazeltine Introduces a New Era in Terminal Economy: Announcing The Hazeltine 1000.

\$ 49 mo.

12-month rental, maintenance included.

The low, low priced Video Display Terminal is here—and naturally it's Hazeltine. If you'd like the speed, flexibility and silence provided only by a CRT, then you'll love the Hazeltine 1000.

Full teletypewriter compatibility, 960-character display (80 x 12), your choice of transmission speeds up to 9600 bps as well as parity generation and checking. Options include upper/lower case, answerback and an auxiliary EIA output. All at a price that fits easily into your budget.

And of course standard equipment includes the unmatched performance and reliability you've come to expect of every product bearing the Hazeltine name.

Delivery is only sixty days, so call now for a demonstration.



Hazeltine
1000



Hazeltine Corporation

Computer Peripheral Equipment, Greenlawn, N.Y. 11740
(516) 549-8800 Telex 96-1435

EAST: NEW YORK (212) 586-1970 □ BOSTON (617) 588-8700
EDISON, N.J. (201) 828-5678

PHILADELPHIA (215) 676-4348

PITTSBURGH (412) 343-4448

MIDWEST: MINNEAPOLIS (612) 854-6555 □ CHICAGO (312) 986-1414

CLEVELAND (216) 752-1030 □ DETROIT (313) 355-3510

SOUTH: DALLAS (214) 223-7778 □ ATLANTA (404) 458-9360

HOUSTON (713) 622-0551

WASHINGTON, D.C. (703) 979-5500

WEST: SAN FRANCISCO (415) 398-0686 □ DENVER (303) 388-8844

LOS ANGELES (213) 553-1811

See us at the
National Computer Conference,
Booths 2344-2349-2351.